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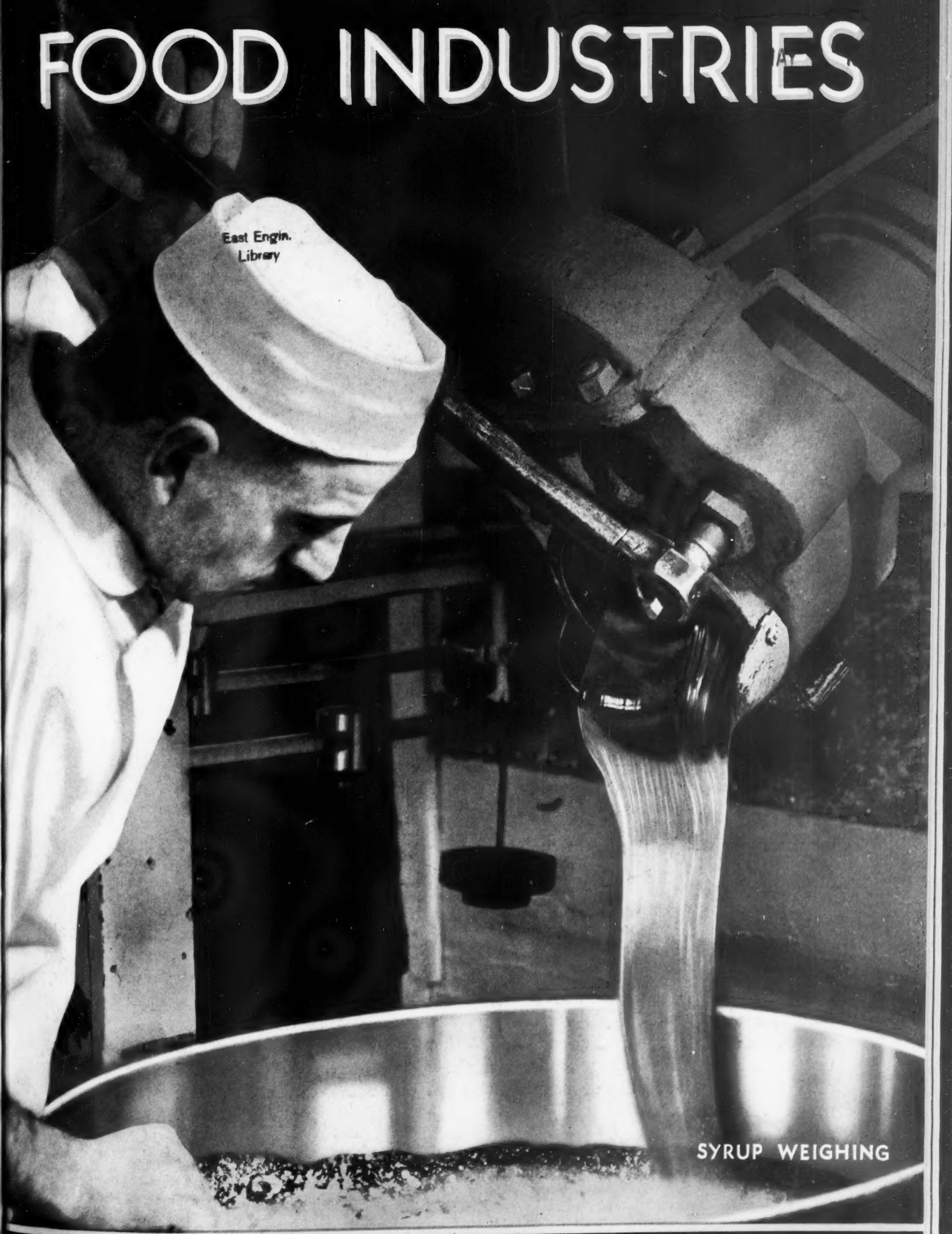

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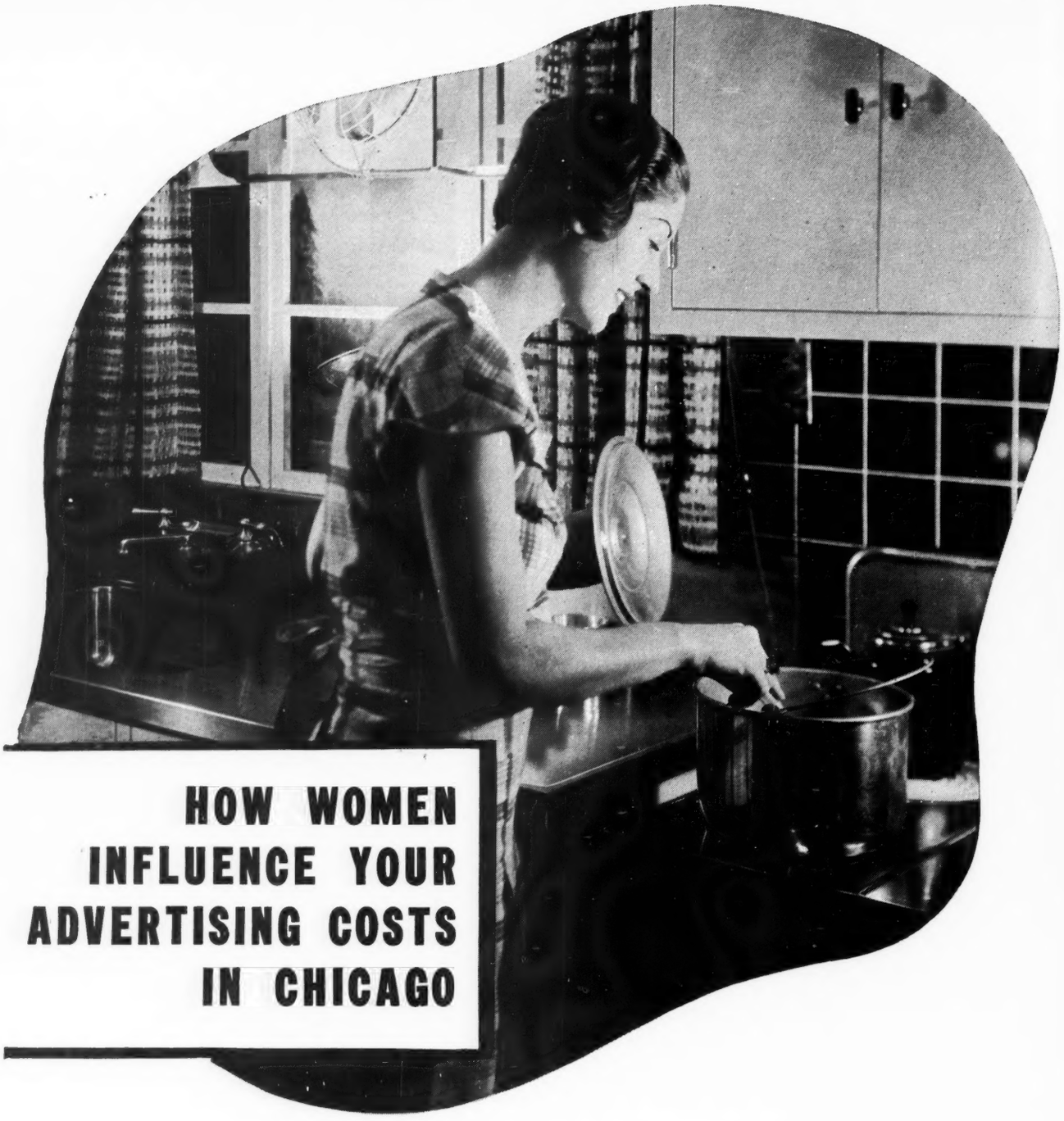
MAY, 1935

McGRAW-HILL PUBLISHING COMPANY, INC



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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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FOOD INDUSTRIES

PRODUCTION • ENGINEERING • DISTRIBUTION

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Vol. 7, No. 5

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Laurence V. Burton, Editor

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MAY 1935

THE TALK OF THE INDUSTRY

UP in the state that has produced those incomparable statesmen, the Brothers La Follette, it is to be required that all hotels and restaurants, serving meals costing 25 cents or more, must serve a third of an ounce of cheese and two-thirds of an ounce of butter with each meal.

We can see ourselves all humped up at a lunch counter in Fond du Lac, or shall it be Appleton, or Kaukauna, breakfasting on grapefruit, oatmeal, doughnuts and coffee. And right there in front of us would be the pat of butter and piece of cheese.

Of course we must shamelessly admit that we do not butter our doughnuts nor dunk our cheese in coffee—at least not in our breakfast coffee. Therefore, when we have completed our meal we shall expect to see the waiter slide our cheese and butter down to the next place and so on un-

til it is consumed or worn out, thereby complying with the splendid new law and restoring prosperity to the sovereign state of Wisconsin.

Any restaurant proprietor who knows his cheese could make a piece of rancid cheese go a long way if he really wanted to.

IN our own more or less limited experience, we have discovered the only good way to eat cheese at breakfast is to order a dish known as Poached Eggs *au gratin a la Mornay* —Eggs *Mornay* for short. A very swell restaurant will charge up to $1 per egg served in this delectable fashion, but cheap restaurants don't know how to make the sauce correctly.

If Wisconsin legislators really want to promote the consumption of cheese and butter, let them popularize Eggs *Mornay* cooked with gobs of cheese (melting cheese, please—none of your bouncing cheese) as the ideal dish for Sunday breakfast throughout the land.

The ingredients are not expensive and will be found in almost any household, but a lot of work and time are consumed in creating this epicurean dish. Any woman can easily master it, though most of them have never even heard of it.

Eggs *Mornay*, a dish for the gods when properly prepared and baked in glass, will come next to Welsh rabbit in stimulating tonnage consumption of cheese if properly popularized.

THIS idea of compulsory featuring of the products of the state grows on one. Let Maryland follow Wisconsin's lead with a law compelling a peck of oysters to be served with each meal. Indiana could demand a can of tomatoes or possibly tomato juice. In Iowa, pork chops or bacon would be a legal requirement. Haddock or cod would be appropriate in Massachusetts while in California it might be a can of peaches or sardines. Of course, this would arouse Maine to action and Maine sardines would be on every counter or hotel table. Alabama would serve yams. Washington would make it salmon or loganberries. In New Jersey it would be soup. Florida and Texas would insist on citrus fruits or shrimp. Michigan would go in heavily

for pickles. In Kentucky—well, how about mint juleps?

Really, the idea is fraught with possibilities.

SPEAKING in a less amiable vein, however, we should like to remind the legislators of Wisconsin that within a couple of years they passed a law raising the permissible water content from 38 to 39 per cent in Wisconsin cheese. That law was a backward move—a move that will make for poorer quality in the long run and result in a diminishing per capita consumption, simply because high moisture cheese is very difficult to cure properly.

This department once bought cheese by the carload in days gone by and combed the markets of the world for satisfactory raw materials. Experience proved that it was a better investment to buy from foreign countries, where the customer could get what he wanted, a low-moisture cheese at a 5-cent per lb. premium than to try to sharp-cure young

cheese of 38 per cent moisture content. The results obtained with the latter were extremely uncertain and too many off-flavored lots developed.

The surest way to increase consumption of any food is to produce it in better quality and better taste—at a reasonable price, of course.

The Rich Get Richer

SECRETARY WALLACE'S AAA hog-control program is doing things of which he never dreamed and which will not please him in the least. There is now under way, as a result of the hog shortage and slow business of the packers, a movement on the part of small packing houses to sell out to the Big Four. And because of the small-plant bargain prices unwittingly created by the brain trust, the good Secretary may find himself confronted with a strongly consolidated meat industry in the form of a Huge Four.

Vital Legislation Pending

SINCE the Copeland Bill has been put on the shelf for another year, four bills of particular moment to the food industries remain before Congress. These are the bill extending the life of NRA until June, 1937; the Wagner labor bill; the Black 30-hour bill; and the bill to amend AAA.

The last of these is a sort of open and shut affair—either you are for it or against it. So many are in the latter category for one reason or another that, by the time it reaches a vote on the floor of Congress, it is hardly likely that its sponsors will even recognize it. Consequently, it may be well to withhold further comment until the bill is in something like its final form. Food manufacturers should continue to follow it, however.

With regard to the other three bills, a situation exists in Washington which should be taken into account by all food manufacturers in their attitude toward the proposed NIRA extension. The bill now before Congress has been framed so that its passage will forestall the passage of the Wagner and Black bills.

The thought behind this seems to be that, if industry wants the NRA enough to support and help pass the bill for its extension, there will be no attempt to push the labor bills. However, should NRA be allowed to lapse, it is expected that strong pressure will be exerted to put these bills through at this session.

Some industries, at least, favor the new NIRA bill, among them the wholesale grocers and the textile manufacturers. With suitable changes, many others could support it and most could tolerate it. On the other hand, we know of none who favor the labor bills.

It would seem that industry is faced with making a choice of the lesser of two evils. An extended NRA would seem preferable to the strait-jacket of the inflexible labor laws.

Another Angle on NRA

SOME very shrewd and astute individuals, although opposed to NRA, are openly working for its extension. Their line of reasoning should give pause to all who think the act is a failure. If a wholly new law is written, they argue, it will be about two years before it can be brought before the Supreme Court for review, whereas the present NIRA is already about to be reviewed.

A new law would, of course, replace the old law and would automatically prevent a review of the old law. They believe that the old law will be declared unconstitutional in a very short time. Therefore, support the move to extend the old law rather than write a new one which cannot be declared unconstitutional for at least two years more, perhaps never.

No Food Law After All

FOOD processing industries do not stand to gain much by the recent action of the Senate in placing the Copeland bill back on the calendar. For, though S.5 is not a bill that every food manufacturer admires, it is doubtful if a perfectly satisfactory bill will ever be produced.

Putting the bill back on the calendar is a polite way of saying that action will be taken in the sweet bye-and-bye (spoken in a quavering voice). Whether it will be taken up again this session depends on how long the session lasts. Betting in Washington is that adjournment will take place between July and September, and that hardly seems enough.

To Spill the Milk

THE Federal Trade Commission has put the fluid milk and ice cream industries on the fire. After investigating conditions in two milk sheds and looking into the fight be-

Hors d'Oeuvres

• Bills introduced in Congress would permit the manufacture of brandy from citrus fruits. Instead of legalizing more alcoholic drinks, why not improve those already on the market?

• *Out in Kansas a hen produced an egg 3½ in. long. This reminds us of the rooster which, upon showing his flock an ostrich egg, told them: "I'm not casting any reflections, but here's what can be done!"*

• Hershey Chocolate Corp. will build a windowless office building. Maybe the company is preparing for labor trouble.

• *Standard Brands' yeast and coffee trucks covered 40,000,000 miles last year. Dated coffee and fresh yeast are good for the oil business, to say the least.*

• Salt production has increased since 1929. Probably because everyone has learned to take things with a grain of salt these last few years.

• *Baltimore politics may get quite spicy in the near future. Friends of George M. Armor, vice-president of the spice house of McCormick & Co., have been urging him to run for mayor.*

• "Let 'em eat cake," said the Queen. "Make 'em eat cheese," says Wisconsin. "Nuts!" says the consumer.

• *A new process used by Gerber Products Co. cuts time in the retort in half by shaking the cans back and forth 140 times a minute. The idea probably came from a burlesque show.*

• Here's an idea for brewers. A Detroit distillery has stocked a farm with cattle so that it can feed the spent grain from its plant. And are the cows contented!

• *Forty Wisconsin bakers are selling breads, pastries, crackers and confections containing organic iodine. Tsk! Tsk! What kind of chemicals won't them food people put in their products!*

tween ice cream manufacturers and the purveyors of counter freezers, the Commission charged the two industries with practically all the high-handed practices in the book.

It would seem that the boys in Washington were laying the groundwork for strict control of the dairy industry, it perhaps being next on their schedule after public utilities. They must be somewhat disappointed, though, at the noticeable lack of attention paid their charges by the press, columnists, cartoonists and other molders of local public opinion.

They may make a big noise yet, however, for the FTC hopes, by virtue of the black picture painted in its report on the Connecticut and Philadelphia milk sheds, to gain an allotment of funds large enough to enable it to spill the milk on a grand scale. Already there has been introduced in the House a bill calling for $200,000 to continue the probe.

Limitations of Brewers' Pitch

WHEN the tin can for beer was in the process of development something was discovered about brewers' pitch that we believe the brewing industry never knew before. Samples of brewers' pitch, tested as linings for the tin can, were found to absorb all the hop flavor out of the beer and leave it tasting like the proverbial dishwater.

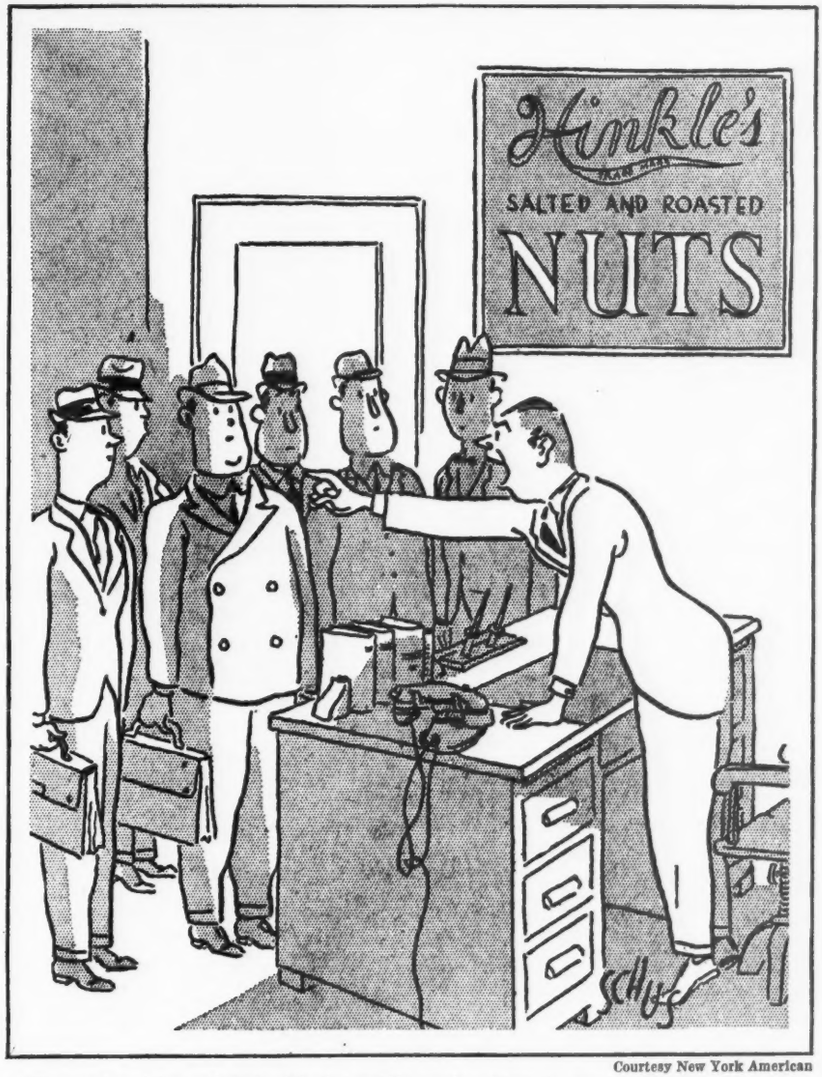
Of course it requires several months for brewers' pitch to complete the absorption of flavor from beer in a can—a condition seldom met in the brewery. Yet it is odd that the traditional lining for tanks and kegs proved to be wholly impractical for single service containers involving long storage periods. No pitch is used for beer cans.

Tomato Pipe Dream

AFTER a dip into the new book, Carotinoide by Prof. Dr. L. Zechmeister and several drags on the old pipe, we resurrect an old pipe dream. For the benefit of the older customers who have forgotten most of their organic chemistry—even as we—it probably won't make sense.

Lycopene, the red color of the tomato, consists of an unsaturated aliphatic molecule involving 13 ethylene linkages, and 40 (count 'em) carbon atoms. Ever since we got stuck with a lot of poorly colored tomatoes, many years ago, we have dreamed of the day when we would invent an electrolytic cell, through which green tomato juice could be passed under suitable temperature and current conditions that would turn it into a scarlet red. The right number of double-bonded carbon atoms that produce color in the lycopene ought to be reduced correctly by this treatment.

Then we could buy half-ripe tomatoes at half-price, give them the works for a small cost, and get rich. Where is the bright young scientist who will prove that it cannot be done?



Courtesy New York American

"We must not be satisfied with the public saying 'Nuts to you!' We've got to make them say 'Hinkle's nuts to you!'"

Kettle Cooking

WHEN deciding on just what style, shape and capacity of steam-jacketed kettle to purchase, there is one important point to keep well in mind. If the production from a series of kettles is depended upon to supply a filling and packaging line without any gaps, it is highly important that all kettles are as nearly alike as possible. One slow kettle in the battery will disrupt the best planned schedule. Delays of this sort are not always attributable to the kettles, however. They may be caused by steam pipes too small for the demand.

How to Use a Chemist

RECENTLY a food manufacturer walked into our office and plunged into a monologue on a subject he should have discussed with his own chemist. Yes, his company employs a chemist: one of mature years, extensive training, and broad experience.

To our suggestion that his problem should be laid before the company chemist he made a quick and emphatic reply that chemists are always playing around with ideas which have no market value and that their only usefulness to a company lies in the routine control work they do.

It seems to us we've heard that comment before. In fact our own company chemist days are not so far behind us but that we can recall that similar comment might have been made concerning our efforts.

Equally well do we recall that it was not until we rose up in righteous indignation at being regarded as an errand boy, or as the official company guide for visitors through the plant, that we found ourselves on common ground with the "G.M.", and in a position to discuss sensibly and intelligently the rôle of a chemist and his potential value to the company in the solution of its product problems.

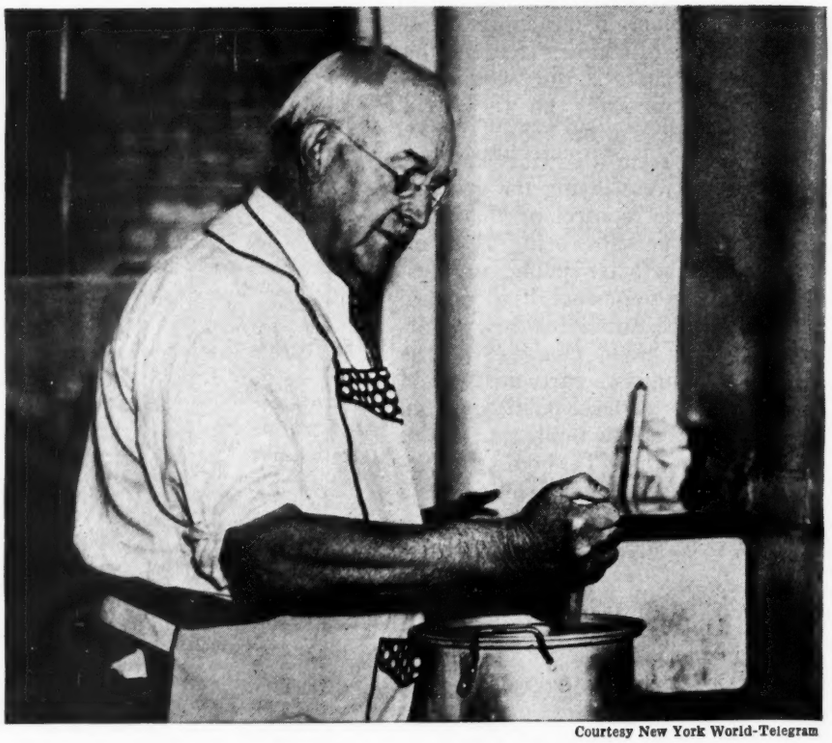
The "G.M." was no more surprised at our willingness and capacity to understand and tackle his problems than we were to get a first hand look-in on what he was trying to do.

If your chemist is regarded as a window decoration, or endured as a poor relation, how can you expect him to have any ideas of commercial value or be worth any more than a routine control watch-dog for you?

You'll have to lay your cards on the table before impersonal strangers when you pay good money to professional consultants who may know practically nothing about your company or your products. Why not first be equally frank with the member of your business family who rightfully deserves your confidence and shares your responsibility to make the company a success?

You might get one of the big surprises of your life. Not every chemist flares up hot-headedly and demands greater consideration and responsibility and thereby acquaints you with his capabilities. Also, chemists with family responsibilities are aware that not all "G.M.'s" would regard such a flare-up other than as insubordination that should be curbed by dismissal or demotion and for that reason are hesitant about forcing your recognizing them as co-workers.

Give your chemist a break by discussing your problems with him in a man-to-man manner. Also give him an opportunity to attend industry conventions or annual meetings and become more familiar with industry problems.



Courtesy New York World-Telegram

THUMBS NOSE AT OLD AGE AND FAILURE

James M. Washburne, who with Elie Sheetz founded the Martha Washington chain of candy stores, a few weeks ago was back where he started his career—selling candy on the streets. The depression had taken his fortune, and he was 80 years old, but he was trying a second comeback. He had developed a new vegetable candy "vegetasties" and was peddling what he could make in his own kitchen. As if in recognition of his spirit, luck favored him. A newspaper wrote up his plight, and he received several offers, some of which were for making and distributing his new confection on a large scale.

No More Birthdays?

NO LONGER can wine manufacturers tell the public the age of their beverages. The Federal Alcohol Control Administration has come to the conclusion, perhaps justly, that the statements of vintners are not altogether to be trusted. "Nothing short of elimination of the age statements seems adequate to protect the public against an epidemic of false assertions of age and against the growth of a totally false idea of the importance and effect of age . . . " says the FACA. A great many consumers will agree with this. Which perhaps accounts, more than high taxes, for the low per capita consumption about which the industry has been complaining.

To Add or Not to Add

MANY a perplexed executive, pondering over questions of company policy toward bolstering up the vitamin contents of processed food, will find the following editorial statement in an eminent scientific publication, *Nature,* of much interest:

"Nevertheless, it is a sound policy to encourage the practice of giving extra sources of vitamins A, C and D."

The foregoing words refer to mixed diets rather than to vitamin food supplements. The value of these vitamins in the diet, irrespective of their source is undeniable, although the statement does not necessarily constitute a wholesale endorsement of boosting their content beyond reason. It will, however, be gratifying to many to ascertain the British viewpoint.

Flake Ice Costs

SOME interesting data on cost of making flake ice came into our hands recently, a summary of which is given herewith:

Initial equipment cost is about $1,000 per ton of 20 tons per day capacity, and $800 per ton for 20 to 40 tons capacity.

Energy used is about 36 kw. per ton of water ice in winter and 47 kw. per ton in summer. One concern found its cost of production in large quantities is $1.40 per ton and at that time was selling it at $2.75. The spread is not all profit, however, for there is a considerable melting loss which must be accounted for. Power at this plant costs 1 cent per kw.-hr.

Salt ice in flaked form is also made at the same plant at a cost of $5 per

ton based on the same power rate and with salt at $10 per ton.

Another Consumer's Group

TO the Consumer's Advisory Board of NRA and the consumer division of AAA is now added a consumers' division of National Emergency Council. This Richberg-bossed unit, therefore, adds its tremendous prestige to the "protect-the-consumer" movement. The objectives are clear and generally acceptable, though administrative methods proposed are vague, impractical and bureaucratic. But the publicity campaigns are marvels of mass attack, bristling with demagoguery, full of consumer deception. As a matter of fact, if food labels contained as much deception as these publicity campaigns, there would be no difficulty, even under the present law, of apprehending many manufacturing culprits.

Fermented Beverages

EVERY doughboy in the A.E.F. during the first World War, having more than a smattering of sanitary science, must often have remarked to himself that, if the principles of sanitation as preached in the United States are absolutely true, how is it that the French population survive at all?

In *Nature*, it is reported that the population of the Island Naura in the Pacific very recently suffered an alarming outbreak of beri-beri. Investigation showed that officials in charge of the island had done two things. They curbed the use of milled cereals, and forbade consumption of the intoxicating national drink —toddy. Both of these acts deprived the population of Vitamin B, and beri-beri developed.

One suspects that fermented—not distilled—beverages may have properties which are capable of beneficial effects not yet fully appreciated. Perhaps the French diet may have something to do with the hardiness of that race.

Plant Inspection

FOOD and Drug Administration officials are delighted with the results obtained thus far in supervising the packing of seafoods, notably canned shrimp. They find that the product packed in factories not subject to supervision has become "almost unsalable." Thus the "voluntary" inspection becomes, in fact, compulsory for commercial reasons. Incidentally, this is going to do away with many small marginal packers and encourage the trend to strong, well-managed enterprise. No one in the Department undertakes to explain how this centralization of business is going to be reconciled with the avowed Administration policy of encouragement for smaller units.

Labor Versus Machinery

NOT only revision of N.I.R.A., but also unemployment insurance, old-age annuities, and other labor benefits, affect the trend for mechanization of the food industries. Any food which has as a large element of factory cost the item of labor will be more affected by the increasing wage and insurance burdens. As a consequence some shift from one food to another is to be expected.

Those executives who have higher than average wage costs relative to total cost of food must be on the alert. They are certainly logical candidates for further mechanization of plants. Thus the laws of competition which cannot be made or repealed by Congress tend to offset the detrimental effects of legislative effort which would advance the workmen's status faster than economic and social adjustment can follow. In the long run, the benefits may be great, but temporary important economic consequences intervene, and the intervention does not always benefit labor.

Too Good to Grade

AN interesting insight into a situation that would arise in the canning industry under grade labeling is seen in the attitude of Northwest canners. At their recent annual convention, they strenuously objected to having their fancy grades marked "Grade A" along with the top grades of other canners. Here's why—in their own modest words: "The Northwest's fancy grades are so much superior to the best grades of other regions that arbitrary classification is impossible."

Strawberry Ice Cream

STRAWBERRY ice cream usually undergoes a slight flavor change on storage—not a whole lot, but nevertheless distinctly perceptible. M. J. Mack, of Massachusetts State College, advocates heating the frozen berries to 160 deg. F. on the theory that the flavor change is caused by an enzyme. R. U. Wood of Pioneer Ice Cream Brands has stated that nothing in the way of prevention of this change is gained by heating.

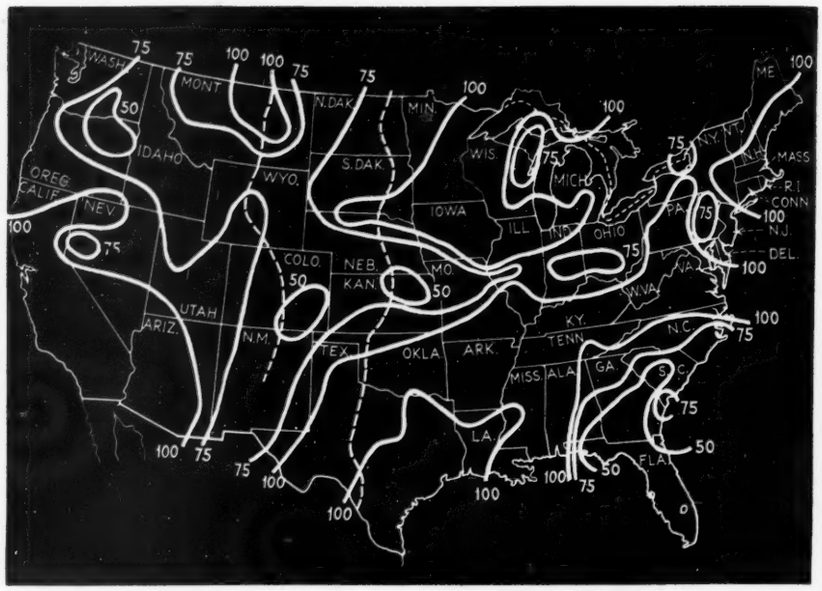
Harris & Ewing

PROPAGANDA POSTERS

This series of posters has been considered by Washington public protectors as a possible basis for a wide-spread campaign to throw the fear of food men into consumers and to make them "value conscious." They were prepared by students of Iowa State University.

Dry Land Ahead

Winter has intensified the drought on the plains but the Mississippi Valley region may come to the rescue



Map showing per cent of normal precipitation for the period from Jan. 1 to April 2, 1935. Dotted lines show the area of extreme drought. The most serious wind erosion has taken place in the western portion of the severe drought area.

DOING a little skywriting in her own grim way, Mother Nature has foretold in dust the disaster which threatens grain and meat production on the Western plains this summer. Low water in wells and reservoirs and great drops in the level of the water table in many sections speak for the unmistakable seriousness of the drought and indicate the swiftness with which any crop-season rainfall will be swallowed up.

As last summer came to a close, it was hoped that winter precipitation would end the drought. But last year's moisture shortages have been intensified, not alleviated, so that in most of the Great Plains states the ground moisture reserves are less than a year ago. Over broad areas encompassing western Oklahoma, Kansas, Nebraska, the Dakotas, Wyoming and Colorado there was no drought-breaking fall of winter rains. Copious rains during the growing season might prevent crop failure, but that is asking almost too much for this semi-arid territory. The Weather Bureau reports no material change as Spring advances.

Even the irrigated districts will have a hard time squeezing by another summer of evaporating heat. The mountain snow pack is mostly below normal, and east of the 100-deg. meridian the outlook for water supplies is critical. Storage on hand in reservoirs on Jan. 1 totaled only 3,085,150 acre-feet as compared with 5,044,100 a year ago.

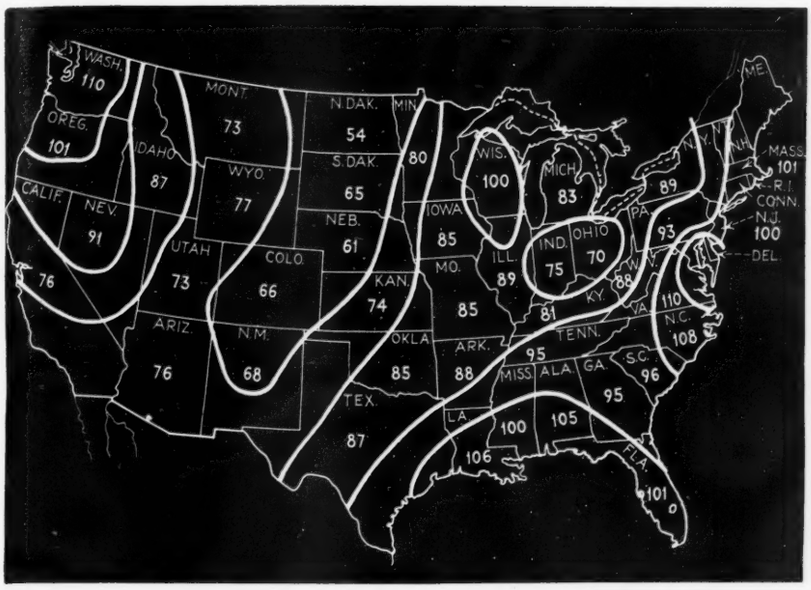
If it were only a lack of moisture that had hit the West, the barrenness of the territory might be considered merely a passing catastrophe, but wind erosion has taken a toll that cannot readily be repaid by rain. In Oklahoma, more than 4,000,000 acres of once fertile soil has been severely damaged, and another 4,000,000 acres in South Dakota is in serious condition. Eight million acres of Texas, largely in the Panhandle, has suffered seriously, some of it being completely destroyed. Montana has 3,000,000 acres in bad condition; Colorado, 9,000,000. In Kansas, 6,000,000 acres has blown to a serious extent, and nearly 800,000 acres have been completely destroyed. In all of these states much greater areas have been moderately affected or are threatened with danger. Government officials have said that 90,000,000 acres in this area has suffered from wind erosion and that 100,000,000 acres more is susceptible.

In the matter of this summer's crops, greatest immediate concern is felt for winter wheat in the Southwestern belt, which extends from the Texas Panhandle to central Nebraska and from the Mississippi Valley states to the mountains. Millions of acres of grain already have been destroyed. Young plants, weak from moisture deficiency and denied a protective covering of snow, fell victims to dust storms and sudden freezes after unseasonably warm weather had started spring growth. Much of the remaining acreage, ordinarily the source of one-third of the wheat crop, has small prospect of reaching maturity. For this to happen would require spring rains more than 20 per cent above normal, of which there is no likelihood. In the spring-wheat regions farther north the deficiency in subsoil moisture probably will result in less than average crops unless the following few months happen to be exceptionally wet.

Periodic drought causes a very serious situation in the northern Great Plains region. In normal times there is only a small amount of precipitation, and any deficiency is disastrous. In North Dakota, for example, there has accumulated in the last five years a rainfall deficiency of about 16.5 in., this representing the enormous quantity of more than 1,800 tons of water per acre.

CONDITIONS in the Mississippi Valley are in contrast with those in the Far West, rainfall having been abundant. Recurrence of crop failure in the corn belt is unlikely since this area ordinarily can produce a fair crop on summer rains. The central and western portions of the Ohio Valley, too, have been blessed, and these sections also have good subsoil conditions. Moreover, the drought in the eastern part of the valley has been alleviated by generous rains in recent weeks.

Official forecasts of the winter wheat crop are, in view of conditions,



Map showing per cent of normal precipitation during 1934. This, with the other map on these pages, gives a comprehensive view of the drought situation to date. It will be noticed that the actual water shortage is enormous in the drier states.

somewhat optimistic. The favorable situation in the Middlewest and Eastern states, it is predicted, will offset the sorry state in the Southwest to give a total production of 435,499,000 bu. as against 405,034,000 bu. harvested last year and 350,792,000 bu. in 1933. This, of course, does not help the spring-wheat outlook.

As to meat prospects on the Western ranges, conditions may not be as bad as they look. If good feed crops are harvested outside the drought area, fewer cattle and sheep may be finished out with heavier grain feeding to partially equalize the situation. The outlook still is generally unsatisfactory in the Central Plains area, where pastures are poor, or slow starting. The Northern Plains ranges, too, are backward, and yard feeding was still necessary in early April. In eastern Wyoming and Colorado, severe dust storms have been hard on livestock. But in other Western areas, the situation is largely satisfactory.

THE general crop report of the Bureau of Agricultural Economics, as of April 1, indicated that in most of the country prospects for winter grains, pastures and a few early Southern crops were about average for the time of year. But a very serious drought situation still exists in the Great Plains states, including an area which normally produces about 15 per cent of the agricultural output of the United States.

No Water Anywhere

Even ground water is vanishing on the Great Plains

By E. W. BENNISON
Engineer, Grand Island, Neb.

► *In the first of these articles the latest information from Washington relating to the drought is summarized. In the following, Mr. Bennison gives first-hand information as to the subsoil moisture in the drought region, perhaps the most important factor governing future crop prospects in that area.*— THE EDITORS.

MUCH has been written about the woeful lack of rainfall in the great food-producing section of the West, about the dry top soil and its erosion by the wind. Important as these factors are, they do not tell the whole story. To get a complete picture of the drought and its effect upon food supplies, consideration must be given the amount of moisture deep in the ground.

Throughout this whole region there has been considerable lowering of pumps and deepening of wells, especially in the river valleys having a large underflow. Wells have failed in those locations where water supplies are obtained from sand and gravel lenses between the drift sheets. And some of the towns, especially in Iowa, have been forced to all sorts of emergency measures, such as hauling water from the rivers in tank cars.

In the immediate vicinity of Grand Island, Neb., there has been a general lowering of the water table until it is all of 20 ft. below where it was ten or twelve years ago. Fifty miles to the west, in Kearney, the underflow of the Platte River has dropped about eleven feet, and 100 miles farther in that direction, at North Platte, it has fallen three or four feet.

Sometime ago I had occasion to observe water conditions in the Illinois River Valley in the vicinity of Peoria. There the water table was uniformly lower by about ten feet. Not long since, I worked in the Arkansas River bottoms on a test program for an oil company, and there I found the water level fifteen feet lower than it once was.

IN the Platte Valley here in Nebraska a large number of irrigation wells were put down in years when the water table was near the surface. And indicative of the lack of moisture is the fact that a great many of these have been rendered useless by a water table so low that the pumps will not deliver enough water to benefit their users. Subirrigated lands have suffered in the same way. In fact, the situation as regards the future water supply is of serious concern in the whole of Nebraska and in surrounding states.

Farmers in this section have taken about all they can stand in the way of punishment from Nature, and a repetition this summer of last year's drought will just about destroy this important agricultural section of the United States. With a deficiency in rainfall of from 20 to 40 per cent throughout the Great Plains area, with light snow in the mountains and with the dust storms wreaking havoc, the outlook is indeed discouraging.

Dressing a Line

Maximum Decorative Effects from Protective Materials

By M. H. LOWENSTEIN

Vice President, Norris Candy Co., Atlanta, Ga.

AMONG the pioneers in the adoption of interpretive art and design in candy boxes has been Norris, Inc., Atlanta, Ga. For years, this company's packages have been designed and re-designed to conform to current interests and fashions.

From the involved modernistic designs of several years ago, these boxes have been changed to designs of simple decoration, of distinctive lettering, and smart papers. Even their contents have been styled to create a harmonious ensemble with the covers. Rich and colorful foils, cleverly arranged trays, delicately tinted bon bons, and bon bon cups to match the color of design, have all been used to make each box a luxuriously appointed gift.

The latest contribution to better packaging of candies by Norris, Inc., is to combine protective with decorative qualities in the selection of box wraps. Last summer each piece of candy in several of Norris, Inc., most popular packages was wrapped in heat-resisting foil in an effort to insure the consumer receiving chocolates unaffected by the summer heat. The results were so convincing as indicated by an appreciable increase in the usual summer sales volume that decision was made to have the entire wraps of two outstanding packages—Gold Box and Whims—consist of heavy, highly polished foil.

THE Gold Box represents a jewel box tooled from gold and is appropriately packed with miniature jewel-like chocolates in gold-colored trays. The Whims box, wrapped in highly polished foil which gives it a silver appearance, carries a brilliant design of red and black and contains a popular assortment of hard and chewy candies. Because of their luxurious artistic appearance both of these foil-wrapped boxes have a high display value and are protected further with clear moisture-resisting Cellophane.

In this era of packaged foods gift packages are only one phase of a candy manufacturer's business. With the return of candy to popularity as a confection for children and with its recognition by doctors as a dietary food there is a demand for less expensive yet attractively prepared boxes of high grade candies.

To meet this demand, Norris, Inc., has within the past two months placed on the market a box of assorted chocolates known as "V-8"; a box of home-made type of candies usually selected piece by piece at a retail candy shop designated as "My Personal Choice," and a box identified as "Assorted French Creams" containing hand-rolled cream centers, with and without nuts, dipped in an appropriately-selected dark sweet chocolate.

Selecting packages for and assortments of candy for any market cannot follow any set rule. Tastes in candy change as rapidly as fashions. Norris, Inc., has found by constantly revamping boxes, creating new pieces, arranging assortments to suit price demand, and always maintaining high quality, it is possible to find favor with the candy tastes of America.

Today's Business, Yesterday's Plant

Making profits under changed conditions demands actual knowledge as a basis of action

By W. R. CARLTON
Springfield, Mass.

OVER five years have passed since the first signs of danger appeared on the business horizon, and four since the regular run of business appreciated that hard times were ahead. These have been years of changes and many a lesson has been learned. For many, however, the fundamental changes necessary to enable an industry to go forward have not yet been made. Instead of making these basic changes many, avoiding the issues, have developed great skill in attempting to get along without really curing the ills.

There is a certain balance to a well-organized company. Financially its various parts are in proper relation to each other. Proper amounts are invested in fixed assets and working capital; its liabilities seem always to be kept within the proper limits. Other concerns appear to get along famously in good going, but when serious sales volume losses appear, working capital soon becomes depleted and too great an amount is found to be invested in fixed assets. The company is out of balance, and unless its growth has been carefully guided with means left open to decrease expenses and overhead in proportion to volume lost, it is in nine cases out of ten licked in spite of all the economies that can be instituted.

Fundamental changes are necessary to restore profits. The real troubles must be sought out by someone who can recognize the ratios which all well-managed concerns observe. But it has too often been demonstrated that what was supposed to be management was in reality not that at all, but merely a drifting; the supposed management having adopted the philosophy of an opportunist. When the time for slick thinking and easy selling was over the craft wallowed helplessly.

It has been said that the average man in business is usually playing one idea only, everything else is secondary. He builds around this idea, and as a consequence becomes narrow-minded. He is not open to new ideas or changes, and loses sight of, or never takes the trouble to learn, the principles of business management. If he is lucky enough, or has the energy, to make his business prosper and grow, failure is all too apt to come in the form of over-expansion of the credit based on his ownership, or through shortage of working capital caused by misuse of funds for capital purposes.

BUSINESS is complex. Varying conditions and circumstances render it futile to attempt standard remedies even for similar situations. But there are always principles of good business to fall back on even if they have been previously ignored. The executive with good practical sense may some time or other get into difficulties, but he wastes no time in getting his affairs back into line.

That common sense remedies can be applied to an existing condition was recently demonstrated by a company whose experience is outlined below.

During boom days this company, like many others, made money easily. It laid plans, expanded somewhat, took on volume, and in a general way lived up to the times. The executives felt that the company was on its way to the dominance of its market. "Hind sight" shows their mistakes, but sound reasoning on working capital conditions and the growth of fixed assets would have indicated weakness in advance and prevented much trouble.

As the depression progressed the truth slowly dawned. Good times were not around the corner; it became apparent that there was wastage ahead. Economy programs were inaugurated to combat conditions but volume dropped rapidly and overhead soon overtook profits. As has been said, mere economy rarely saves a really difficult situation. They had expanded without also providing plans for proper adjustment for loss of volume. As before mentioned when a company runs into heavy weather the sooner it puts its house in order the better. Many are lost by trying desperate economy plans when fundamentally the whole financial set-up is badly out of line.

IT took the company under consideration over three years to appreciate these facts. They were recognized none too soon. Final realization that volume could not come back under the present conditions caused prompt and vigorous action, even if belated. A survey of existing conditions by competent persons brought out the following facts:

1—Shortage of net working capital.

2—Cash balance too small.

3—Accounts Receivable:
(a) Some old accounts on books.
(b) Present business collections OK.

4—Accounts Payable overdue. No cash discounts taken. Being carefully handled but overdue balances were beginning to cause some trouble.

5—Investment in Fixed Assets too heavy for amount of sales volume.

6—Sales Volume:
While not nearly as large as formerly, it still represented a substantiol sum and from the point of volume alone was large enough to show a fine profit if other parts of the busi-

ness were in balance. The company had previously made money on the same volume.

7—Inventories were shown to be accurately taken and priced.

8—An engineering report of the plant facilities brought out the following:

(a) Plant large enough for over four times present volume. (Plant on two floors of one building with a warehouse attached).

(b) Plant facilities could be rearranged to occupy one-eighth (⅛) of present space.

1—A saving of about 50 per cent on labor should result.

2—Large savings of light, power and supplies would be made.

(c) Purchase of two new machines would eliminate several old ones and save 50 per cent of operating time.

(d) Other equipment was in fairly good shape.

9—Reduced sales made curtailment in sales department not only necessary but advantageous. Each salesman must be more productive and delivery loads heavier.

It was advised that the following steps be taken:

1—Prepare a budget to fit the present sales volume in entire disregard of present practice.

2—Bring operations into line with budget.

The president of the company became the budget manager and in a series of conferences made an analysis of the needs of the company at the present time, under present volume. The start was made in the sales and delivery department. Planning for present day actual sales was a different matter from trying to cut a peak organization down to fit present conditions. It meant considerable elimination and brought payrolls into line. It was found possible to reorganize the whole department in keeping with the best modern ideals of sales and fleet management and maintenance.

Within a few weeks the budget appeared somewhat as shown in the accompanying table.

You will note that all departments had completed their budgeting work except the plant department. This was done for a reason. If the business were to continue, certain basic expenses of executive and general nature were absolutely necessary and unavoidable. The company must also make provision for the sale and delivery of its product. The executive expense, general expense, and sales and delivery expense sections were set at a rock bottom minimum. A start was made with these sections because under 9 (above), sections (a), (b), and (c) pointed out certain changes as absolutely necessary in the plant; the development of the budget in this way gave a clue to the available funds for plant operations. The plan given under 8 (b) (above) was studied and it was deemed advisable to follow it. The plant was accordingly rearranged. The new equipment was set up and considerable old machinery was sold or junked. Operation was made possible in only a small part of the space originally used. It worked out even better than anticipated. It is in fact an admirably arranged plant at the present time.

The shortage of working capital was remedied in a proper manner. The owners raised additional capital funds; they increased their investment in working capital. The plant changes were financed in part by the machinery people and in part by a loan from one of the agencies which the Government has created for emergency work.

(Turn to page 260)

Budget Outline June, 1934, One Month

	One Year		One Month	
Sales		$262,899.96		$21,908.33
Cost of Sales (last twelve months)		145,741.56		12,145.13
		$117,158.40		$9,763.20
Executive and General Exp. (Estimated)				
Salaries	$14,400.00		$1,200.00	
Insurance	1,800.00		150.00	
Supplies	1,200.00		100.00	
General	1,200.00	18,600.00	100.00	1,550.00
		$98,558.40		$8,213.20
Plant Expense				
Wages	.....		.....	
Supplies	.....		.....	
Power	.....		.....	
General	.....		.....	
Depreciation	.....	52,058.40	.....	4,338.20
		$46,500.00		$3,875.00
Selling and Delivery (Estimated)				
Wages and Commission	$11,400.00		$950.00	
Auto Expense	4,800.00		400.00	
Advertising	2,400.00		200.00	
General	1,800.00		150.00	
Depreciation	2,100.00	22,500.00	175.00	1,875.00
Net Gain (Estimated)		$24,000.00		$2,000.00

Average Month's Operations Prior to and After Change

	Prior to Change		After Change	
Sales		$21,908.33		$22,468.20
Opening Inventory	$1,801.60		$1,783.10	
Purchases	12,299.73		*13,758.86	
	$14,101.33		$15,541.96	
Closing Inventory	1,956.20	12,145.13	1,979.56	13,562.40
		$9,763.20		$8,905.80
Executive and General Expense				
Salaries	$1,782.90		$1,201.02	
Insurance	150.00		153.20	
Supplies	180.50		106.50	
General	240.90	2,354.30	94.27	1,554.99
		$7,408.90		$7,350.81
Plant Expense				
Wages	$3,652.20		$1,860.32	
Supplies	782.60		582.90	
Power	750.00		457.20	
General	191.50		89.70	
Depreciation	462.30	5,838.60	400.00	3,390.12
		$1,570.30		$3,960.69
Selling and Delivery				
Wages and Commission	$2,483.00		$1,962.20	
Auto Expense	591.60		409.60	
Advertising	221.50		301.50	
General	162.20		127.96	
Depreciation	208.90	3,667.20	175.00	2,976.26
Net *Loss* or Gain		*$2,096.90*		$984.43

*Higher price for raw material after change.

Canned Beer

New technique in beverage packaging gives simplification and compactness in plant equipment, more than a 60 per cent saving in storage space requirements, a 50 per cent saving in handling expense, and protection against photo-chemical deterioration.

By E. S. STATELER
Associate Editor, FOOD INDUSTRIES

TRADITION bound as the brewing industry is generally reputed to be, there have been several surprising and significant developments in it since the return of legal beer.

None of the departures from the traditional practices of the industry is more startling than the adoption of a sanitary, enamel-lined, gas-tight tin can as a container for beer and ale to be marketed through the same retail outlets as are the bottled beverages. Introduced to the Richmond, Va., market late in January this year, canned Krueger beer and ale rapidly acquired a market recognition that is significant.

Equally significant to the brewer is the difference between those portions of the G. Krueger Brewing Company plant in which the tin cans and the glass bottles are filled and made ready for shipment.

Years ago, when the glass bottle joined the traditional wooden keg as a means of getting both ale and beer from the brewery to the place of consumption, the brewing industry found that it had to add a bottling house and a government storage tank cellar to its plant facilities. Now canning lines supplement bottle lines in the bottling house.

The bottling plant called for the installation of such units as bottle soakers and washers, fillers and cappers, pasteurizers, and labelers in addition to conveyors, loading and unloading facilities, and storage space for both the cases of empty and filled bottles. All of this represents a heavy capital investment and further requires an investment in bottles and cases and in a different type of delivery truck than that used for beer in kegs. In a compactly laid out bottling plant a production of 120 12-oz. bottles per minute calls for about 3,000 sq.ft. of operating floor space and a storage space of 1,700 sq.ft. for each 1,000 wooden cases used; whether full or empty. If corrugated paper cartons are used, 1,100 sq.ft. floor space is required for each 1,000 cartons of filled or empty bottles held in storage.

BEER in cans is more modest in its requirements. Much of the difference is due to the use of more compact and specially designed equipment than is common to the bottled beverage industry. For a 160-per minute production of 12-oz. cans an operating floor space of only about 1,400 sq.ft. is required. Hence the saving in the operating department is over 50 per cent.

Savings in the storage floor space requirements and in the handling and trucking facilities are based upon the differences in the height and in the weight of the bottles and cans. In this respect the filled can has a height of slightly less than one-half and a weight only 60 per cent of that of a filled standard glass beer bottle. These differences mean that cartons of canned beer can be stacked much higher than cartons of bottled beer to give the same weight per sq.ft. and result in a 64 per cent saving in storage space requirements. The savings are greater if comparison is made with bottled beer stored in wooden cases. Also, because of these differences, the existing trucking and handling capacities are doubled when used for canned beer or ale.

As yet there appears to be no saving in container cost as the sanitary lithographed cans can be used only once whereas the glass bottles are used over and over. Even including the cost of the labels, crowns, and neck foil the cost of the bottle containers may prove no greater than that of the cans. However, there is a strong claim that the can protects the beer from the photochemical effects of light, thereby maintaining the initial quality of the beer or ale for a greater length of time. Also because metal is a better conductor than glass and there is no likelihood of breakage the cans can be heated to pasteurizing temperatures quicker than bottles and, conversely, can be more quickly cooled to temperatures for consumption.

IN the G. Krueger Brewing Company plant in Newark, N. J., the only source for canned beer at the present time, advantage is being taken

of these possible savings by confining the canning plant to a floor space of 24x40 ft. on the first floor and about half that space on the second floor.

The cans are delivered to the brewery from the nearest American Can Company plant in Jersey City, by truck in corrugated paper cartons; 24 cans to the carton. On caster-fitted truck racks these cartons of cans are taken to the can-feeding department on the second floor.

Here an operator turns the carton upside down on a revolving feeding plate so that the cans start into the production line with bottoms up and without being handled directly by an operator. As the feeding table revolves the cans are directed into a standard American Can Company can runway at the mouth of which the cans are turned into a horizontal position and caused to roll through an opening in the floor and along about 100 ft. of this can runway which is suspended from the ceiling of the canning room and serves as a storage for dry empty cans. The empty cartons are placed on a roller conveyor which carries them to the casing machine to be refilled with full cans.

From the storage runway the cans feed as wanted through a Hansen sanitary can washer which operates under a variable speed control to supply cans to the filling machine as rapidly as desired. In this compact can washer, also suspended from the ceiling, hence requiring no floor space, each can gets a direct inside washing with a jet of hot or cold water or steam as desired. Since the cans were thoroughly sterilized during the enamel baking operation at the can making plant, the only dirt and possible contaminants to be removed are those which dust into the cans during shipment from the can plant and during passage through the runway to the washer.

UNDER synchronized electric control, standard with up-to-date canning installations, the cans are turned into an upright position and fed by gravity to a 34-station Bishop and Babcock rotary filler at the rate of 150 per min. This filler is essentially the same as that used to fill 12-oz. glass bottles except that the filler heads are designed to fit just inside the 2½-in. top opening of the cans and to direct the flow of beverage against and down the walls of the cans eliminating the need for a plunger type filler head to prevent foaming. Loss of gas volume during filling is very low and claimed to be no greater than when bottles are used; partly because the beverage has a filling temperature of about 33 deg. F., is under a counter pressure of 5 to 7 lb. per sq.in. in the filler, feeds into cans without foaming, and upon discharge from the filler the cans pass through a space of only about 2 ft. to a revolving transfer disk into a six-pocket turret to be loosely covered with an enamel-lined, gasketed lid. In the course of passage through this 2-ft. interval the filled cans pass under an electric fill detector, the electrode of which moves through a vertical plane in synchronization with the movement of the can through the horizontal plane. If the can is slack filled, the electrode fails to make contact with the beverage and close the electric circuit which permits the can to pass into the lidding and sealing unit. The coordination of the action is such that the slack-filled can does not receive a lid but moves on to a second revolving transfer disk which removes it from the production line.

After the filled can passes from under the fill detector a jet of the beverage is shot into the can to cause a slight foaming so that when the lid falls in place over the can opening there is no head space containing atmospheric oxygen which might cause deterioration of the beverage or the can during storage or shipment. From the lidding unit the filled can passes into a standard Canco No. 400 double seamer which gives the can a gas-tight seal.

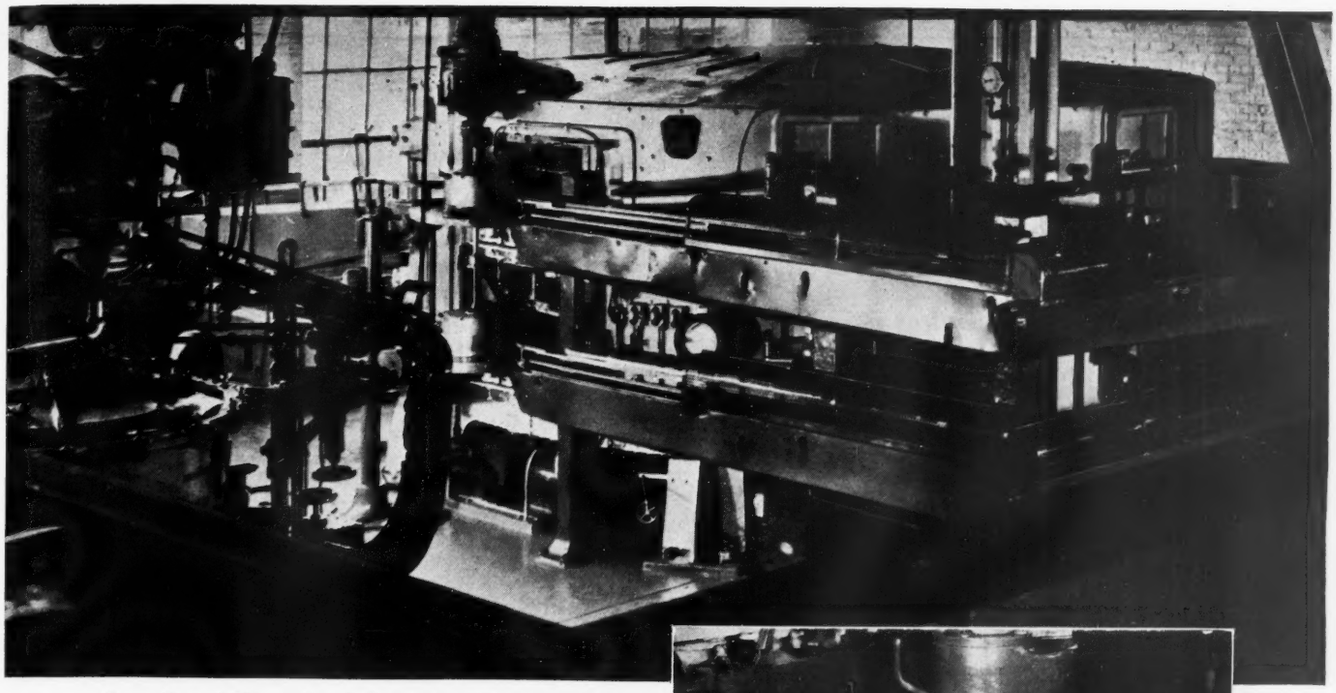
THE construction of these cans is such that they retain their normal shape under internal pressure of more than 75 lb. per sq.in. instead of the customary 18 lb. for tin cans; and the seams are capable of withstanding a strain of more than 300 lb. per sq.in. without ripping open. These factors are of much importance to the brewer, to the merchandiser, and to the consumer because of the temperature and barometric changes to which the can and its contents may be subjected between the sealing of the can at the plant and the consumption of its contents.

A two-lane American Can Company conveyor directs alternate cans from the closing machine to an upper and a lower compartment in a specially designed Foster-Wheeler spray type hot water pasteurizer. The decks of these compartments rotate to move the sealed cans through a preheating, a pasteurizing, and a cooling zone at such a rate that out of a total 43 minutes of pasteurizing time they are subjected to 142 deg. F. for twenty minutes and leave the pasteurizer at about 5 deg. F. above room temperature. This procedure, aided by the rapid transfer of heat by the tin can, gives rapid temperature changes but avoids spotty heating which might affect the flavor of the beer.

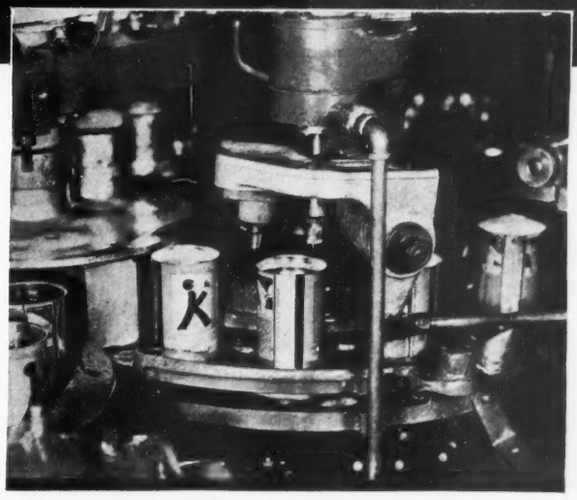
Bringing the cans from the pasteurizer at 5 deg. F. above room temperature prevents condensation of atmospheric moisture on the can surfaces after these side surfaces have been freed from pasteurizer moisture by passage through a standard American Can Company air blast can dryer unit in the conveyor line. Water adhering to the ends of the cans is blown off in a second unit after the cans from the two pasteurizer compartments have been reunited into a single line conveyor prior to being elevated to second floor and discharged into a storage runway suspended from the ceiling of the second floor.

This storage runway feeds directly into a Canco No. 200 ink marker which codes each can on one end. As the marking dies are quickly and easily changed, the code marks can be made to indicate whatever the brewer desires. The coded cans pass directly to a runway feeding into a Standard-Knapp casing machine. Here the filled cans are loaded back into the corrugated paper cartons and passed along on a roller conveyor to a companion sealer. They are then ready for storage or delivery to a roller conveyor system leading to the storage department and finally to the shipping platform.

ALTHOUGH the use of cans by G. Krueger Brewing Company for beer and ale is still in an advanced experimental stage, the results of the first commercial market test indicate not only a strong consumer acceptance but also a growing demand on the part of both repeat and new consumers. Production executives of this company are already concerned about meeting the hot season demand for canned beer from the as yet restricted markets in which this beer is being sold. Just how long it will take for canned beer to get national acceptance is problematical but it is a present-day development in the brewing industry which must be taken into account when expensive changes are being considered in connection with existing brewing plants, or when the erection of new plants are being considered.

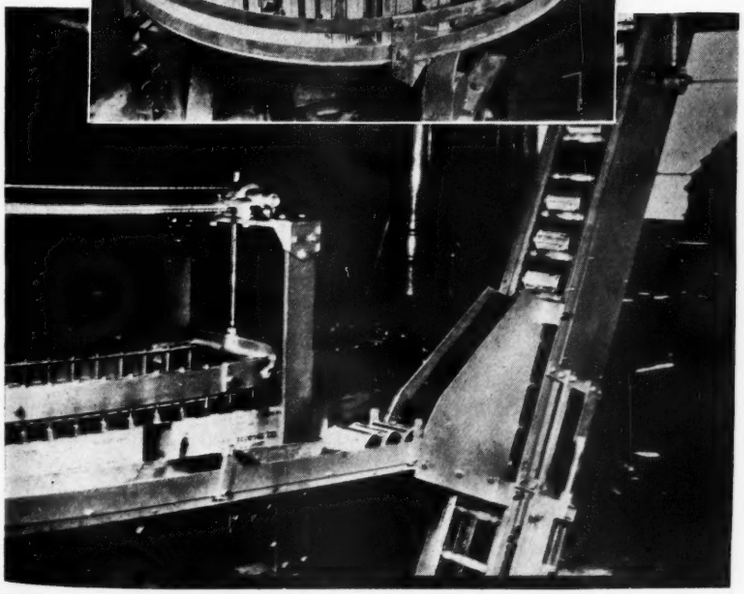


Less than 1,000 sq.ft. of floor space is required to wash, fill, seal and sterilize 160 12-oz. beer cans per minute.

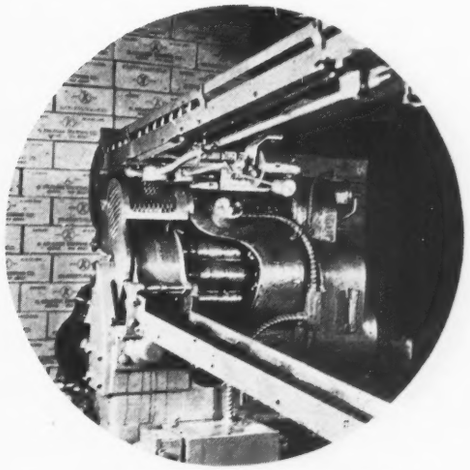


Before entering double seamer each can is checked for fill and shot with a jet of beer to eliminate air-oxygen from headspace.

Below: Empty cans are fed into the production line by a revolving disk onto which they are emptied, bottom up, from their corrugated paper containers.



Standard canning plant runways convey cans from one operation to another. All are under electrical control which prevents a jam in the line in case of a sudden shut down of a unit.



One end of each can is ink-marked with such code designations as the brewer desires.

New Light on Rancidity

Revealing its effect on nutritional value, what it is, how to detect and measure it.

By G. A. WIESEHAHN
Chicago, Ill.

This is the first of two articles by Doctor Wiesehahn, dealing with the subject of rancidity, and bringing together, in brief space, a summary of recent progress in dealing with this troublesome problem. The second article will appear in an early issue. —The Editors.

A FACTOR of rancidity which has received little consideration is its effect on the nutritional value of foods. This, however, is of considerable interest. Mattill[1] has found that easily oxidized fats, such as lard and butter, are likely to destroy vitamins A and E, either before or after ingestion. But with the better stabilized oils or anti-oxygenic substances, such as wheat oil, this destruction does not occur.

Other work indicates that fat may be harmful even before rancidity is detectable by odor and taste.[2] Dogs and rats receiving small amounts of slightly oxidized lard in a special diet showed symptoms similar to those of animals receiving no fat, and an increase of the amount led to earlier death. The degree of oxidation of this lard was no greater than often found in household fats, but there is little danger to consumers because of the various sources of fat in the average diet. The findings, however, show the importance of freshness to the nutritional value of fat.

The chemistry of rancidity is very complex, and the experimental evidence to prove the formulated reactions concerning it are scant. This is due in part to the complexity of fats and to the difficulty of preparing chemically pure unsaturated acids and glycerides. As early as a century ago rancidity was explained as an oxidation process, and today it is generally accepted as such where microorganisms are not involved. In more recent years we have learned that the rate of oxygen absorption by natural fats is at first very slow, gradually rising to a maximum and finally declining. Only the earlier part of this reaction is of interest to the food manufacturer, because the rancid odor and taste are developed long before the maximum rate is reached.

According to present knowledge, oxygen reacts with the double bonds of the unsaturated acid residues of the glycerides to form peroxides. Then these break down into substances largely of aldehyde character. Among them are epihydrin aldehyde, which is set free by the addition of hydrochloric acid, and heptylic and nonylic aldehydes, which are probably among the odoriferous material. The products of the oxidation make the process autocatalytic, speeding it up to a surprising rate. But according to Roschen and Newton,[3] the peroxides and substances volatile at 100 deg. C. do not act as catalysts.

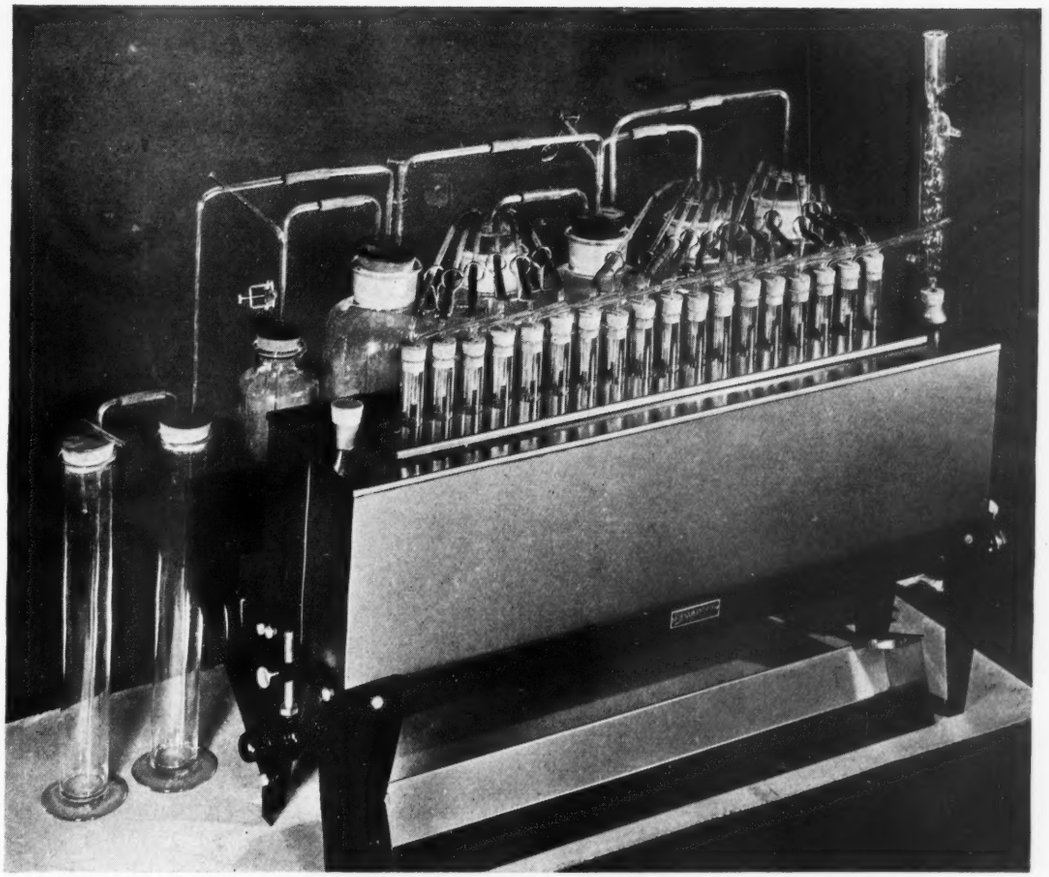
The oxidation products form the base of various tests for detecting oxidative changes in a fat before they become perceptible to the senses. The three most important of these are the peroxide test based on the liberation of iodine by the peroxide oxygen, the v.Fellenberg test for aldehydes and the Kreis method. The latter is the most widely known chemical test for rancidity. A very convenient modification of the peroxide value has been described by Wheeler.[4] The v.Fellenberg test has been worked into a quantitative estimation of fat-aldehyde values.[5]

THE importance of the Kreis test often has been overestimated. The color caused by the reaction of epihydrin aldehyde with the phloroglucinol sometimes is not given by rancid fats, which is the case after spoilage in vacuum. And this color occasionally is misleading in fresh oils, such as cottonseed oil, especially as few laboratories are equipped for the spectrophotometric measurements necessary in such cases. It is possible to avoid some of the interference by blowing the volatile epihydrin aldehyde out of the fat-acid mixture before letting it react with the phloroglucinol. This permits a quantitative estimation of aldehyde which is independent of the oil color.[6]

The "ketonic" rancidity of butter and margarine is usually considered apart from the "oxidative" or "aldehydic" spoilage. But there is no doubt that under certain conditions ketones are formed in fats in the absence of microorganisms. Fats and unsaturated fatty acids, as well as glycerol, cholesterol, paraffin and the saturated aliphatic acids (with the exception of formic and acetic), develop ketones on irradiation.[7] The reaction of ketones with salicylic aldehyde has been used in a test for their determination in fats.[8] However, acetylmethylcarbinol, a mother substance of butter aroma, will make the reaction positive even in the complete absence of decomposition.[9]

All these tests have their value, but they are not absolute indicators of the state of oxidation. The results obtained will vary with the various types of fat and the storage conditions. So lard will be rancid at a peroxide value much lower than that at which an oil would possess objectionable odor. And in the dark, the development of organoleptic rancidity is much slower compared with that of peroxides than in the light.[10] It is, therefore, often difficult to determine whether or not rancidity exists as long as there is no specific test for malodorous substances.

But as an indication of the condition of a fat, the methods to detect its resistance to oxidation give valuable



Developed in the laboratories of Swift & Co., this apparatus provides a reliable means of determining the relative keeping quality of fats and oils. Its operation is based upon the formation of aldehydes and peroxides in oxidative decomposition, and it interprets stability in terms of quantity of peroxides formed during exposure to accelerated oxidative conditions.

information for practical purposes. Of these, there are four general types. One uses light to hasten oxidation, with the fading of methylene blue as the indicator.[11] The others employ high temperatures. The simplest test consists of storing samples in beakers or bottles, usually at 60 deg. C., and examining them daily for odor. It has the disadvantage of slowness, since well-keeping fats may require weeks for turning rancid. But this is avoided if the temperature is raised to 95 deg. and the air replaced by oxygen (the disappearance of the oxygen is measured volumetrically), or if blowing is resorted to and the peroxide value determined at hourly intervals.[12] With these procedures, most results are obtained within a working day. The time required for the fat to absorb a certain amount of oxygen, for example 20 per cent by volume, or for it to reach a peroxide value characteristic of the beginning of organoleptic rancidity, gives a numerical index of the keeping quality. Even if a poor fat should have been brought to a negative Kreis test and a negligible peroxide value by heat treatment, the absence of any induction period will reveal its lack of stability within an hour in an accelerated oxygen absorption test. The volumetric method has also been used for other products, such as crackers, and found more reliable than the testing of the shortening before baking.[13] Some stability tests make use of the increase in speed of absorption by exposing a large surface of the oil.[14]

ENZYMES often have been suspected of being responsible for rancidity. But only recently has this been definitely ascertained. André and Hou found that the oil of crushed soy beans had the characteristics of blown oil after exposure to air in moist condition for a few days, and that heating of the bean material before exposure prevented this change.[15] The heat treatment of soy-bean flour for deodorization is common practice, and the destruction of the enzyme by the heat prevents rapid deterioration. There is little doubt that this lipoxidase, as the enzyme was called by its discoverers, is widely distributed. The fact that whole-wheat flour, especially the germ, has poor keeping quality while wheat oil has antioxygenic properties is easily explained by the presence of such an enzyme. As in the case of soy beans, toasting the germ, thus inactivating the lipoxidase, improves stability.[16] The presence of a fat-oxidizing enzyme (oleinase) which survives pasteurization also has been reported in milk.[17]

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Laboratory Dollars

Or what a little applied chemistry did for a meat packer

By E. S. HURD

Production Manager and Research Director, Stahl-Meyer, Inc., Brooklyn, N. Y.

WAYS and means of saving a good many hundreds of dollars in production costs have been worked out in the research laboratory of Stahl-Meyer, Inc., Brooklyn, N. Y. What is perhaps more important, old processing methods have been improved and several new processes and new products have been developed.

This laboratory had its inception five years ago when one burette and an electric hot-plate were purchased for determining the free-fatty-acid content of the lard rendered and refined in the plant. From this small beginning, the functions and equipment have been expanded until the laboratory now is used to control all of the processes of the plant, to test the raw materials and to lead the way to progress through research.

Periodical analyses are made of the salt, sugar, spices and meat which go into sausage and other products and into the cures used in the plant. The meats for the various sausages are analyzed at intervals for protein and moisture content to insure uniformly high quality. Moreover, the finished products are analyzed almost daily, and when the laboratory reveals an improper condition, the processes and ingredients are examined step by step until the cause is located. If the bologna maker, to take an example, should slip up, he can be sure that he will be found out. All of which is sufficient incentive to make him do his job as it ought to be done.

In curing meat, it is essential to exercise close chemical control because of the many factors involved in the process. Stahl-Meyer makes good use of its laboratory to do this. The chemist, among other things, maintains a check on the rapidity and degree of change of the nitrates to nitrites in color fixation. This insures cured meats with an appetizing appearance.

The canning done in the plant also is under laboratory control, as is the smoking process. Lard rendering and refining, too, are watched closely, periodical tests being made for free fatty acid, oxygen absorption, iodine count, congealing point and moisture.

CONTROL of the chemical composition of water consumed in a meat plant, as in any other food processing plant, is quite important, and Stahl-Meyer employs its laboratory for this purpose. Care is taken to maintain the proper pH value in the water and to regulate its hardness and mineral content.

A biochemist is kept busy in the laboratory making analyses and conducting research, with the author acting as supervisor. The laboratory is equipped with enough apparatus and supplies to handle the daily problems and to conduct research.

One piece of equipment, that for nitrogen digestion, was especially designed by the author, the apparatus available on the market being too large to fit the space available for it. The flask holder of this apparatus takes the shape of an arc and is supported over bunsen burners by short iron legs. The holder, which has holes to accommodate eight flasks at one time, is U-shaped in cross-section so that its sides extend down beside the burners, holes in the front side permitting lighting and observation of the flame. Over the holder is mounted a hood with a pipe connecting to a $\frac{1}{4}$-hp. blower that carries the fumes and undesirable gases outside the laboratory. Underneath the hood is a metal piece with holes that support the necks of the eight flasks. This apparatus is fabricated from lead-coated iron, and the blower also embodies corrosion-resistant material.

Equipped to handle all the chemistry involved in the processing and curing of meat, except for bacteriological work, the laboratory has largely eliminated the guess-work and hit-and-miss operations of the packing plant. Additional information and data are being collected day by day, and equipment for bacteriological work to expedite fact gathering may be installed in the future.

AS TO the cost to the packer of setting up a laboratory, it will vary from a few hundred to several thousand dollars, according to the size and variety of his production. But he may be assured that the cost will be little compared with the savings.

In this research laboratory has been accomplished many things of practical value to Stahl-Meyer, Inc.

Herva Matte

Can it capture an American market? To make this possible, the manufacturing and handling must be improved to yield a uniform, high quality product suited to our needs.

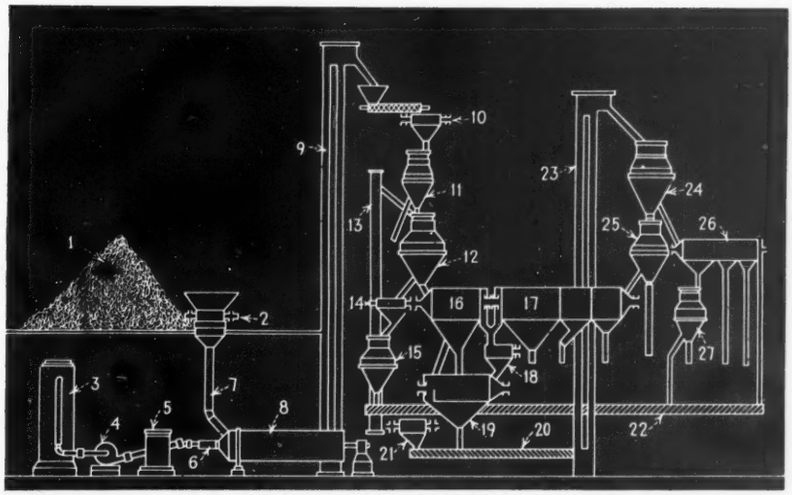
By REO BENNETT
New York, N. Y.

PROBLEMS of foreign exchange and trade balances may bring about the introduction of herva matte into the United States where private efforts have failed. Brazil's Foreign Trade Commission, created recently for the purpose of meeting demands of foreign debts and purchases of needed materials in foreign markets, has decided that the time is propitious and has authorized an advertising campaign in the United States to popularize matte.

Superficial studies have been made by some of the largest selling organizations in America as to the possibities of introducing herva matte and various conclusions have been reached. Some have decided that it should be introduced as a health-food, because of the many virtues claimed for it. Others think that, in order to juggle with the flavor, it should be presented as a soda-fountain or bottled drink. Just why its legitimate claims as a mental stimulant, eliminator of fatigue and nutritive beverage are not sufficient to put it in the tea and coffee class is hard to understand.

It would seem, however, that American interest in herva matte has concerned itself exclusively with the selling end of the business, or shall we say that, until now, only salesmen, have interested themselves in matte. One does not question the fact that selling is the final proof of, and reason for; but rather, whether the matte business of South America is ready to support the sellers in its present state of development.

So far as we know nobody from the United States has ever made a proper study of matte. So far as we know, there exist no documents such as would be accepted by the U. S. Food and Drug Bureau or the American Medical Association as to claims for vitamin, alkaloid and nutritive contents, which are the basis of all present therapeutic claims for matte.



Sketch of an automatic matte mill designed to produce a uniform type of matte suitable for the American market.

(1) Fresh, green matte leaves on twigs; (2) Cutter which reduces leaves and twigs; (3) Gas generator; (4) Suction fan; (5) Gas scrubber; (6) Muffler; (7) Tube which conducts cut matte leaves to flame; (8) Toasting chamber; (9) Elevator for conveying toasted leaves and twigs to cutter (10); (11) Twig eliminator; (12) Cyclone for separating out leaves with stems attached and allowing clean leaves to pass on; (14) Cutter for removing stems from leaves; (15) Separator for separating stems from leaves; (16) Revolving screen; (17) to (27) Additional cutters and screens for removing all fines, etc., and producing a sized product.

Yet all of the matte sold thus far in the United States has been sold upon unsubstantiated claims and the matte dealers either fear or are in constant difficulties with the Government authorities, not because matte lacks the properties claimed, but because they are not substantiated by acceptable proof. That proper research would produce satisfactory results there is every reason to believe, but the research has not been made.

IT is when one comes to production, however, that real questions arise. Matte is a product of the forest, produced over a wide-spread area. Most of the people in the business are descendants of families that have pursued the business for generations. This Brazilian family supplies that Argentine family. The distributor in turn has his customers. They have their peculiar predelictions. So that there is production of a great many different types and varieties. Factories confine themselves to these recognized types and are not particularly flexible when it comes to producing such quantities of a standardized and uniform type as a big American movement would require.

The herva matte business is to all intents and purposes in the wooden age at present, and before it can hope to take its place on the shelves, along with tea and coffee, it must be rejuvenated, even as they have been, in laboratory and machine shop.

The Brazilian Chemical Institute maintains a laboratory in Parana so that matte destined for export may be analyzed and the rigid exigencies of the Argentine and Chilean matte

regulations observed. It is only permitted to harvest matte in the winter months, between April and September, when the sap is down, and the growth of the trees suspended. The same tree may only be pruned once in three years, and it is prohibited to cut down or destroy a matte tree on any pretext except public service. The whole industry is regulated by laws calculated to conserve the trees, to protect against adulteration, to assist tax collections, and to minimize difficulties with inspectors at foreign custom-houses.

IN the harvesting, all branches up to about 1 in. in diameter are lopped off and piled at a given point. The tree is left absolutely bare. A fire of hardwood is built and reduced to a bed of red-hot embers with a minimum of smoke. An expert now takes each branch and passes it over the fire, manipulating it in such a manner as to produce a uniform application of heat to all parts of the branch. The process is accompanied by a crackling noise, as of miniature fire-crackers, as each leaf cell is exploded by the moisture contained. The leaves lose about 50 per cent of their weight by this process and assume a bright green color, brighter than their original color on the tree. Something more than the expulsion of moisture takes place in this process of rapid toasting without burning, as the matte gains its flavor at this time and never tastes so good again. Matte dried in an oven never gains this flavor.

The toasted leaves still attached to the twigs are now removed from the branches, done up into bunches and transported to the dryer. The original process as used in Parana was to smoke the leaves for twenty or more hours in a smoke house, just as the farmer smokes hams. This smoke pervaded product keeps indefinitely but it requires a cultivated taste and is only to be encountered in rural districts. Aromatic woods are used in the process. In the common process in use today a huge grid or rack of saplings is constructed under a roof thatched with palm branches. A furnace is built at some distance from the center of the floor under the grid and the heated air is conducted to the grid by a tunnel, so that matte piled on the grid is subjected to heat which contains little or no smoke. This process further dries the product, but has also the effect of curing it so that it will withstand the vicisitudes of transportation to the matte mills of Curityba or Buenos Aires.

As it is still attached to the twigs it all goes to the "cancha." The latest form of cancha is a circular bin 15 ft. across and 3 ft. deep, with a floor of perforated cast iron segments. A roller, studded with wooden paddles, is dragged around on the matte, which is forced through the holes. Any twigs which will not pass the holes are thrown away. The product is now the finished product of the forest, and the raw material of the matte-mills.

The present type of matte mill was conceived by carpenters and rule-of-thumb engineers, to produce the types of matte desired by their customers. Its functions are to pound, grind and pulverize the leaves and such of the sticks and twigs as the product contains, and then sift it into various classifications. These mills are all right for the purpose for which they were designed, but could not be counted upon to produce great quantities of the type of matte that would be accepted by Americans, as will be explained.

OF ALL the matte used in South America, 90 per cent is of the chimarrao type (pronounced Shimerong). This is a finely pulverized product with leaf particles not exceeding 1 mm. in diameter. The tea type, such as should be sold in the United States, is called Chileno, and consists of clean leaf particles about 3 mm. in diameter and is free from powder, twigs, and leaf ribs in any form. With the mechanical equipment of the present mills not more than 20 per cent of this type is produced. It is a by-product of the chimarrão. Chimarrão is the meal ticket. For this reason, Brazilian matte manufacturers never get very enthusiastic over the idea of furnishing the American market with its colossal potential consumption. They would have to change their whole equipment to enter a market that would accept but 20 per cent of their product.

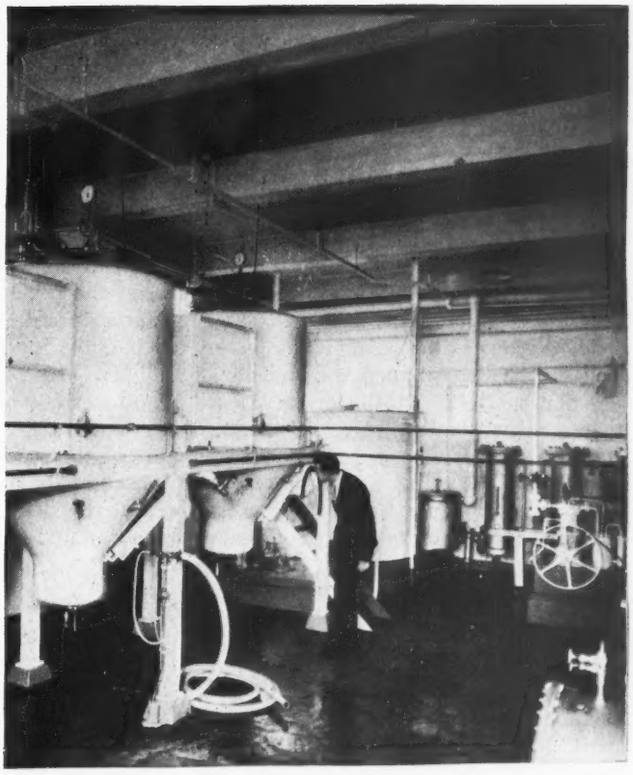
Having outlined the general scheme of the matte industry, as conducted today, let us consider the defects and opportunity for improvement. Matte first achieved popularity as a stimulant, food auxiliary and anti-scorbutic; valuable if not priceless properties to the early arrivals in South America. It substituted for alcohol as a stimulant and social beverage, counteracted fatigue during long and arduous voyages, and took the place of vegetables where meat was the only available food for long periods. It is still treasured for these and other half-proven qualities.

The ingredients which are responsible for these valuable properties are very unstable, subject to oxidase or enzyme action. Consequently, great care must be taken in manufacturing processes to preserve them; otherwise the matte loses its aromatic, agreeable flavor and becomes just so much hay, so to speak, and not very palatable hay at that.

THE first reform recommended is to improve the toasting process as conducted in the forest. It is impossible to toast the leaves uniformly, however expert the workman may be; charred leaves ruin the matte and under-toasted leaves are prone to destructive fermentations. The process recommended would employ producer-gas generated by aromatic hardwoods that would improve the flavor of the product. The leaves, previously removed from the twigs in the forest, would be dropped systematically into the flame and the degree of toasting would be regulated by the force of the suction fan. The process has already been experimented with, with complete success. The type of matte produced was pronounced universally a surprising improvement upon any it was compared with.

If experiment could develop a system for cutting the green leaves to desired sizes, passing them immediately through the flame and while hot and dry, to a vacuum package, the problem would be solved and matte could more than compete with existing beverages.

Until the green leaf cutting idea is perfected, if that is possible, the gas-dried leaves should be shipped in barrels directly to the mills, as the burlap sacks favors enzymic action, admitting rain, mist and whatnot to the hygroscopic material, so that acetic acid often develops on the voyage, to say nothing of spontaneous combustion and other phenomena of fermentation. The toasted leaves should be shipped to New York and milled here, as the cutting and classifying machinery immediately available is far superior to anything to be found in the matte mills of Brazil or Argentina. The toasted leaves would enter duty free while the manufactured leaves must pay 10 per cent ad valorum.



This pilot fermenting plant is a small edition of Hoffman's main system. Each of the miniature fermenters handles eight barrels.

Piloting Production

Miniature plants bridge gap between laboratory and factory. Facilitate product development. Save money.

By HALDANE GEE
New York, N. Y.

PILOT PLANTS, for many years important tools in the chemical industry, are now proving valuable instruments of food manufacturing. The pilot plant, or "semi-works," is the production trick which bridges the gap between the laboratory and the plant. It usually is equipped with semi-commercial apparatus—pocket-size editions of standard factory machinery.

Most obvious of pilot-plant applications is the trial of new products or formulas under conditions comparable to those prevailing for full-scale batches, but with a saving in the cost of raw material. A similar task is the appraisal or development of new equipment for a process proven in the laboratory, but where the purchase of thousand-gallon units will represent a large financial loss, should they prove unsuited or unsuccessful.

Piloting will also solve new-product cost problems where costs cannot be ascertained from market reports on raw material and engineering calculations of the cost of manufacture. And allied information may be desired on the personnel overhead of a new process. Again, the pilot plant can be used as a training school for plant operatives.

The semi-works has, on occasion, been used for actual production. Making samples of lines which have not attained volume sale and manufacturing minor specialties for which the full plant cannot be operated profitably—these are two jobs to which the semi-works has been assigned. Although these functions might not alone justify a new semi-works installation, they illustrate its convenience.

Pilot plants capable of serving all of the foregoing purposes are necessarily permanent institutions, as are some designed recently for food industries. Others, however, are essentially one-time propositions, on occasion assembled from junk, used to solve a problem and subsequently scrapped.

AN ELABORATE pilot plant is the recently - built miniature brewery of the Hoffman Beverage Co., Newark, N. J. Model breweries have been used in the past by brewing schools, but the Hoffman installation is believed to be the first thorough-going semi-works to become an integral and permanent part of a modern commercial brewery. Hoffman has paid in the pilot plant the same attention to detail which characterizes the full-scale process. The scale is such that gallon quantities in the pilot plant become approximately barrel quantities in the main plant. This pilot installation will be used for exhaustive trials of formulas and for perfecting new beverages.

Since the pilot unit links the laboratory and the plant, there may be expected a difference of opinion as to whether piloting should be under the control of research or production departments. Good practice dictates that the research staff have charge of pilot operations. In the case of General Foods Corp. the gap between research and production is bridged by an engineering research department.

A typical General Foods piloted process is blanching Brazil nuts. This operation follows shelling and involves removal of the brown peel from the meat. The incentive for devising a blanching process lay in the fact that kernels were twice as expensive as unpeeled nuts, what with the blanching operation being performed in England.

The trick in this case was to separate a tough, oil-free skin from a kernel two-thirds oil. This task was turned over to a research man and one helper, who, within three months, had invented a pilot plant which blanched successfully. This was assembled mostly from scrap and cost otherwise only $1,800.

This pilot plant was so successful that, with minor improvements, it soon was placed in regular service in the nut department, handling a ton of

Brazils a day. Plans were out for a larger plant to cost $5,000 when research revealed an even more economical process, and the original method was abandoned. With the first process, the skins were chipped off the kernels, but the second plant operated on the dissolving principle. It cost only $600 and handled three tons a day.

General Foods has indorsed the permanent pilot plant for chocolate. The Walter Baker plant at Boston will shortly be equipped with machinery for handling 100-lb. lots of chocolate coatings and fillings, permitting the trial of customers' proposed formulas without tying up regular production equipment.

Though the use of the pilot plant in baking has been limited, there are some examples of its adoption. Miniature mixers and molders have proven convenient for production problems on bread, but there does not seem to have been devised a successful traveling oven in any small size.

THE pilot plant obviously is best suited to centralized manufacturing operations. This limitation may explain why it is not better known in the food field, where the perishable commodities are processed at a number of branch plants. An organization operating several similar factories may, however, regard any one of them as a pilot plant.

Just such a procedure has been adopted by one of the large national baking chains. Changes and improvements suggested by the laboratory are assigned to different plants for test runs, each bakery handling one or two experimental doughs a day, with different phases of the problem assigned to different units. This plan evens the load of development work, obviates the necessity for a special pilot plant and permits also the elimination of possible local variable factors.

There has been a complete miniature bakery in operation in New York for ten years. This installation is part of the research equipment of the Fleischmann Laboratories. It has repeatedly demonstrated its value for experimental work. All of the commercial bakery processes are represented, but the equipment is more than a small-size bread factory. Refinements have been added to guarantee accurate control and recording of humidity and temperature.

Most of the equipment in the pilot bakery was purchased originally from stock. One of the units, however, the oven, did require special design. When the pilot bakery was first assembled, it included a traveling oven 36 ft. long. But too much time was required for warming up the oven, and sample loaves could be taken only at the center of the run, involving waste of bread. This boosted costs, and the traveling oven was abandoned. Its place was taken by an electric oven fitted with special temperature controls and equipped with steam pipes to regulate humidity. The oven has two shelves, each about six feet square, and it accommodates a batch of 150 one-pound loaves. Experimental bakes are both accurate and convenient.

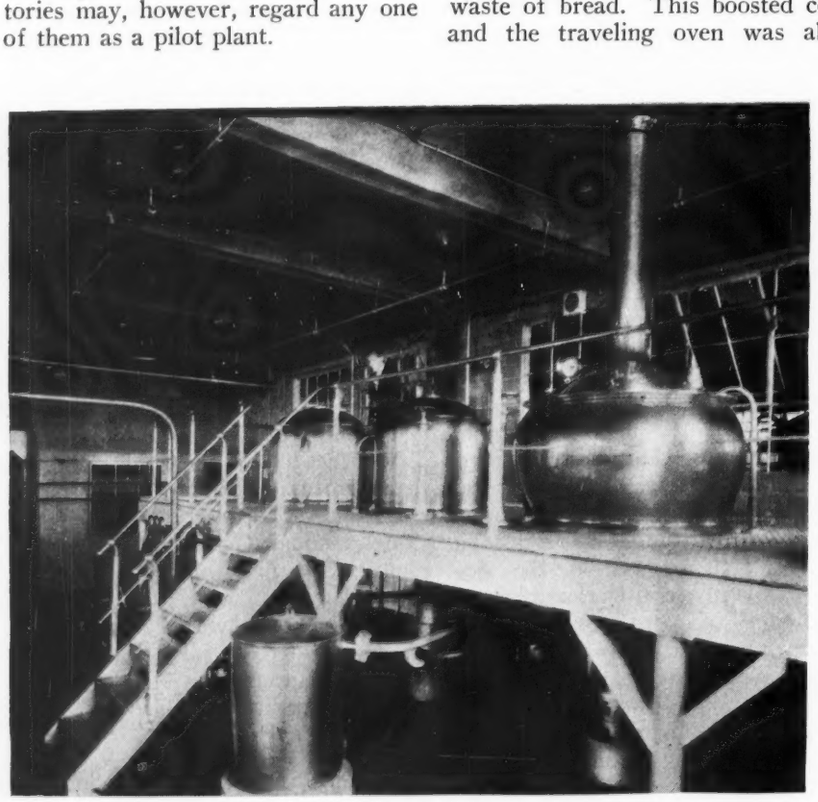
The Fleischmann pilot bakery has been used to try out dough conditioners and to correct the diastatic deficiency of certain flours. Two phases of the dough conditioning problem have been handled. One is the nutrition of the yeast during its active period, involving variations in the nitrogen and phosphorus available for the organisms. The other is the modification of the flour gluten to increase plasticity, a result achieved with oxidizing salts. Bolstering the diastase content of flours, the other important pilot-plant research problem, entails changes in the enzyme complex of the malt syrup.

SINCE 1922, the Fleischmann Laboratories have made extensive use of the pilot procedure in yeast manufacture, the pilot plant duplicating the conditions prevailing in full-scale yeast manufacturing. With Fleischmann commercial yeast plants handling batches of 20,000 to 30,000 lb., the pilot installations are designed for lots of 300 to 800 lb., and even as low as a few pounds can be grown.

Pilot yeast plants are now in existence at branch factories at Peekskill and Chicago. The Fleischmann Laboratories pilot plant, where much of the earlier research was conducted, was partially dismantled after the experimental work was completed. Sufficient of the pilot apparatus was left intact, however, to permit quick reassembly of the equipment should new problems arise.

The experience of the Fleischmann Laboratories with the semi-works has been so satisfactory that several other processes have been studied with this technique. At the Peekskill factory is a semi-works designed for protein hydrolysate. The Cincinnati factory has a semi-works for malt enzymes.

The main laboratory in New York has, in addition to the miniature bakery, another pilot plant devoted to the experimental manufacture of malt syrups and of diastatic preparations from malt. The malt plant has resulted in a number of valuable discoveries about this class of products which would likely have been missed in routine factory operations.



Pilot brewhouse at Hoffman Beverage Co. It is complete in every detail, even to being supplied with filtered air.

Egg Yolk "Makes" Mayonnaise

Correct Application of the Principles of Emulsification Also Governs Quality of Product

By LOWELL B. KILGORE

Colloid Research Laboratories, Washington, D. C.

MAYONNAISE is distinguished from other salad dressings by its heavy consistency or body, its palate-smoothness and its fresh, uncooked flavor. These characteristics are largely due to the physical form by which it is constituted, namely that of a heavy, semi-solid emulsion of the oil-in-water type. The ingredient which is responsible for the production of this emulsion is the egg yolk. In other words, mayonnaise is made possible by the strong emulsifying powers of egg yolk, whereby a large proportion of oil is incorporated into a small proportion of water to form a fine-grained, stable emulsion. Thus, in a very real sense, the egg yolk "makes" the mayonnaise.

It is evident from these general considerations that the egg yolk is one of the chief concerns of the mayonnaise manufacturer. In this article an attempt will be made to summarize the results of recent research as well as the best practices regarding the use of yolk in making mayonnaise by the batch method.

Mayonnaise was first made using freshly-separated yolks. Although this method is still used where practicable, most manufacturers now depend on some kind of preserved yolk. This is especially true of the many small mayonnaise plants of local ownership. These manufacturers are too far away from a commercial source of fresh yolk to obtain it at a reasonable price.

AT the present time, preserved yolks are available in five main conditions: frozen salted, frozen sugared, fresh refrigerated, especially treated and dried. This is also the order of their volume consumption by the mayonnaise trade. Since the frozen yolk occupies the place of leading importance and, especially since the smaller mayonnaise manufacturer uses a frozen yolk, salted or sugared, this discussion will be largely devoted to the problems encountered in its use. For the same reasons the familiar batch method of manufacture is understood unless otherwise stipulated.

The starting mixture for a batch of mayonnaise usually consists of egg yolk, sugar, salt and spices and a small amount of vinegar. The oil is slowly added to this mixture until the emulsion begins to "make," when the rate of oil addition may be increased to a suitable rate. The physical condition of this starting mixture appears to control the quality of the finished product, provided a suitable formula is employed. Two conditions must be adhered to in regard to the nature of the starting mixture. First, it must contain sufficient moisture to start the emulsifying process and carry it on until at least half of the oil has been added. Second, it must have a heavy body, like a thick paste, yet smooth in texture. This second qualification appears to be necessary to the production of a fine "grain" in the emulsion. Now in order to gain these two ends the yolk must be in the proper physical condition.

Consider the use of fresh yolk for a moment. Fresh yolk is usually too light in body to produce a good emulsion at the start. This is true in spite of the fact that fresh yolk is the best possible emulsifier and that less can be used than is required for frozen yolk. The reason is simply this: there is too much "free" moisture present. Approximately 50 per cent of the yolk is water. It may be "free" as in fresh yolk or "bound" as in preserved yolks, salted or sugared. By "free" water is meant water as a component of a heterogeneous mixture. In such a condition it will freeze at 32 deg. F., will evaporate readily and will dilute any water soluble substance in contact with it. "Bound" water cannot do any of these things. Therefore, when the amount of moisture is given in per cent by weight in a starting mixture, its effect upon the emulsion cannot be predicted unless the condition or state of the moisture is also known. This will be evident from the following considerations regarding the use of the different types of yolks.

EXCESS "free" moisture in fresh yolks may be reduced by varying the procedure. For example, either by adding half of the yolk at the start and the remainder after the emulsion has been well started or by using sufficient salt, sugar and spices to bind the excess moisture. The salt especially has a strong water-binding power. The exact amount most desirable to use depends upon the weight of yolk used. About 5 to 7 per cent of salt based on the total weight of the starting mixture is a good ratio. Another excellent water-holding agent suitable for the purpose is pressed or de-fatted mustard flour. (See Kilgore, L. B., Mustard and the Mayonnaise, *Glass Packer*, October, 1932, February, 1933; and Corran, J. W., Emulsification by Mustard, *Food Manufacturer*, January, 1934.) This also has two additional advantages: it gives the heavy paste body that is so desirable; and the mustard has been shown to have decided emulsifying properties of its own.

Thus, we see that in the case of fresh yolks a means must be provided whereby the free moisture is held in a paste form in order to start a fine-grained, smooth emulsion which is essential to a good mayonnaise. In the case of the frozen, preserved yolk, this problem is partially taken care of by the packer. When a frozen yolk of good quality is allowed to come up to room temperature evenly, it should be a smooth, heavy paste of about the correct consistency. A suitable way in which to insure an even thaw is to place the cans in an ice chest or mechanical refrigerator, at about 45 deg. F., over night. If a sufficient number of cans is used, six or more, they may simply be set over night in an insulated box and the thawing will take place in a satisfactory manner. In no case should the thawing be rushed by heating or by the addition of water. This rough treatment would spoil the results which the packer is striving to obtain, namely, a smooth product with little loss in emulsifying powers. So a schedule of operations allowing time for the thawing is absolutely essential if the frozen yolk is to give the best results.

It was stated above that the "free" water which was present in the case of the fresh yolks is bound very securely in the treated and frozen yolks. In order to start the emulsion it is often necessary therefore to supply a small amount of free moisture by adding a little vinegar at the start of the batch. This is especially true when the spices, sugar and condiments are added in a dry form at the start. Just how much liquid should be added at the start depends upon many conditions. Gray and his coworkers (see Gray, Southwick and Maier, *The Glass Packer,* October, 1929) have shown that in general, the lower moisture content given by vinegar added at the start the higher the consistency of the finished batch. The reverse also appears to be true. It is obvious that the consistency of the finished mayonnaise cannot be increased indefinitely by continually reducing the initial moisture. At all times there must be enough moisture present to hold the oil being fed in. Otherwise the emulsion will break before sufficient oil has been added to get the batch properly started. It seems advisable not to add more vinegar until at least one-half of the oil is in the emulsion, otherwise a decided drop in the final consistency will be obtained. The best practice appears to be the addition of just enough vinegar at the start to make a heavy paste of the yolk and spices. Beat it until smooth and no longer. Then run in the oil until half has been added, add another portion of vinegar equal to that added at the start, and the remainder at the end of the batch. The whole point of the matter is this: that the least possible excess free moisture should be present while the oil is being added.

THE above procedure for making mayonnaise is probably the most conventional one. There are many variations used by ingenious manufacturers in which the same principle is employed, although the details of the process may be different. For example, another solution to the problem of producing high consistency mayonnaise having medium or low yolk content, is to start the emulsion by means of some finished mayonnaise added to the yolk and spices. This trick of starting an emulsion, or "seeding" it, by means of one previously made is common in pharmaceuticals. It is the fundamental principle of a process for continuous emulsification.

MANUFACTURERS often ask, "How much yolk should be used in making mayonnaise?" Of course the answer to that question depends upon the equipment available and the method of procedure. But that is evading the issue, for one who really desires some definite figures on the subject. The question may be considered in two ways. First, is there an upper limit above which the addition of more yolk fails to improve the texture or quality of the product? Second, what is the lower limit below which it would be inadvisable to go?

In order to avoid all the complications arising from the various procedures used for making mayonnaise, the writer attempted to develop a chemical method of determinnig the correct amount of yolk for a certain type formula. (See Kilgore, L. B., *Egg and Poultry Journal,* March, 1933.) The results showed practically no correlation. This clearly indicated that above a certain minimum egg yolk content, say, 5 per cent up to about 8 to 9 per cent, the differences in the character of the mayonnaises tested depended upon the procedure used in their manufacture and not upon the amount of yolk used. Of course more yolk than is indicated in the above range may be used, but for texture of the emulsion as well as stability, no advantage is gained by using a higher percentage. In regard to a minimum yolk content it may be noted that as a general rule a lower percentage of freshly-separated yolks may be used than of frozen or treated yolks.

It is well to refer to the definition of mayonnaise salad dressing furnished by the Food and Drug Division of the Department of Agriculture and by the Mayonnaise Institute, when considering any reduction in the yolk content. This is mentioned here due to the fact that such a lowering may well come within the total egg and oil content and yet the same formula would include more moisture than is stipulated by the definition. The only way in which a liquid may be added directly so as to raise the moisture content is by means of vinegar or lemon juice. By vinegar is meant no less than 40-grain, or 4 per cent, acetic acidity. Figures indicate how easy it is to use vinegar of lower strength. The acetic acidity of a mayonnaise usually does not exceed 0.5 per cent as acetic acidity; most manufacturers use about 0.4 per cent. Now, 0.4 per cent acetic acidity would be gained by adding 10 per cent of the weakest strength vinegar, any additional moisture would be considered as water. Allowing 3 per cent for spices, sugar and condiments, a mayonnaise of 0.4 per cent acidity would contain 87 per cent total yolk and oil.

OF COURSE, whole eggs may be used and the moisture would be raised, but not as much could be added as vinegar or the consistency would be drastically lowered. Obviously, the moisture that would equal the amount present if the whites corresponding to the yolks had been used, cannot be added as water. Therefore, when the yolk content is lowered, oil is usually substituted in its place; but there is a limit to the amount of oil a certain amount of yolk is able to emulsify. The working formula for mayonnaise is therefore rather well defined. As regards the three main constituents, yolk, oil and vinegar, it is closely delimited. The differences noted in the texture and stability of mayonnaise are in general caused more by the procedure and quality of the materials used than by the formula.

Assuming a good formula and correct procedure, the single ingredient which most influences the character of the finished product is the yolk. The yolk "makes" the mayonnaise.

Tested Cleansers *for* *Dairy Plants*

PART ONE

Extensive experiments determine relative cost, efficiency and practicability of various alkalis in washing containers.

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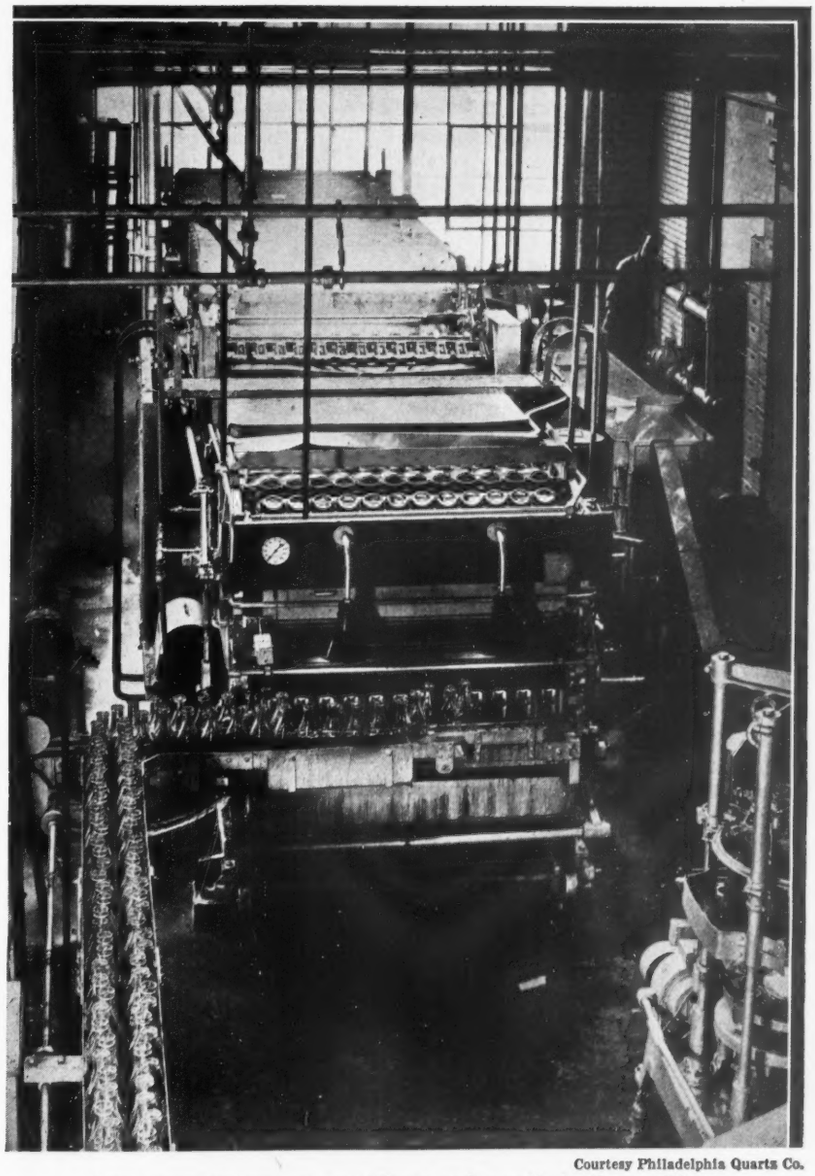


Courtesy Philadelphia Quarts Co.

Low concentrations of metasilicate and caustic in the washing solution produce a clean, commercially sterile milk bottle.

CLEANING solutions for dairy plants which combine minimum cost with maximum effectiveness and practicability have been worked out by the author in an extended series of experiments. These studies, comprising carefully-controlled washing tests, were undertaken after it had been demonstrated that good cleaning could be accomplished with sodium metasilicate in concentrations as low as 0.3 per cent of total alkali. The usual procedure had been to employ concentrations of 3 per cent, or more.

Started four years ago, the tests really took the form of comparisons of sodium metasilicate with other well-known basic alkalis and a number of alkaline mixtures sold as special brands. All cleaners were rated primarily on a performance basis, and whenever little choice existed between the relative efficiencies of two or more products, cost was the deciding factor.

The result of these experiments are presented in two installments. This, the first, covers the findings in the bottle and can washing tests. It shows that a physically clean and satisfactorily sterile milk bottle can be obtained with relatively low concentrations of metasilicate and caustic and that small amounts of metasilicate do a good job of can washing.

A series of bottle washing tests was carried out on a set of four four-tank Meyer-Dumore bottle washers, each of which delivered approximately 40,000 bottles during the day's run. Performance of the cleaning solutions was rated as satisfactory when the bottles attained an arbitrary standard of physical appearance and met the established requirement on bacteria counts. The tests were extremely valuable in helping to establish the superiority of certain combinations of alkalis for cleaning milk bottles.

IN these experiments, no attempt was made to prepare soaker-tank solutions which would be 100 per cent efficient in bactericidal power. Rather, the studies were conducted on the premise that a physically clean bottle would be practically sterile. Therefore, special care and control were exercised in respect to the temperatures of the soaking solutions, concentrations and combinations of alkalis so that after the last water rinses every bottle would be perfectly clean and free of all traces of alkali. Of course, the bottles in all washing machines were given a final chlorine rinse, although a large number of plate counts made before the chlorination demonstrated satisfactorily that a physically clean, bright bottle free of any haze or rinse-water fog was sterile, showing a count below 50 (see Table 1 on page 232).

On the basis of established practices it was found that straight caustic soda, caustic-ash mixtures and Compound A (composed principally of caustic and ash, see Table 1, appendix) would not consistently give the desired bottle at any concentrations from 0.5 per cent to 3.5 per cent total alkalinity.

Trisodium phosphate, straight, produced a bottle meeting the standard at concentrations as low as 0.3 per cent total alkali. However the cost was excessive (see test 12 in table).

Sodium metasilicate, straight, met the standards, but costs again were high, and mechanical difficulties in operating the washer were encountered before the test run was completed.

Commercial "wet" mixtures of caustic and trisodium phosphate gave a satisfactory bottle, but here again costs were higher than the formula finally selected. A mixture of caustic and trisodium phosphate proved effective, but the best combination of the two, even at the lowest concentration consistent with uniform results, gave washing costs greater than the formula chosen.

AS a result of this series of tests, extending over a period of almost two years, the procedure in Table 2 now is standard.

The washer is a four-tank, twelve-bottle-wide Meyer-Dumore with a capacity of 120 bottles per minute. The primary requirement of the daily make-up is to maintain a 0.5-0.7 per cent total alkali concentration in tank 1. Ordinarily, this strength is maintained by the daily addition of 20 lb. each of caustic and sodium metasilicate; of course, a "quality" bottle must be delivered at all times. After 28 days of operation all tanks are drained, cleaned out and recharged.

Table 2: Standard Procedure

Tank	Capacity (gal.)	Temperature (deg. F.)	Initial Charge
1	560	110	80 lb. of flake caustic
2	600	140	60 lb. of flake caustic; 20 lb. of sodium metasilicate
3	600	150	60 lb. of sodium metasilicate
4	450	95	Rinse water

Daily make-up: 20 lb. of caustic; 20 lb. of sodium metasilicate in Tank 1.

The Dumore Junior is a single tank, eight-bottle-wide machine having a capacity of 60 bottles per minute. The tank holds 875 gal. (standard type is 650 gal.), having been enlarged so the bottles would remain in the soaker solution for 25 minutes. It is charged with 75 lb. of caustic and 50 lb. of sodium metasilicate. The temperature is held at 140 deg. F. The average daily additions consist of 10 lb. of caustic and 10 lb. of sodium metasilicate, which is sufficient to maintain 0.8-1.0 per cent total alkali concentration and produce a quality bottle. After 28 days of operation, the tank is drained, cleaned and recharged.

A three-tank Ladewig washer, twelve-bottles wide, also is being used. It has a washing rate of 60 bottles per minute. The first tank, holding 495 gal., is charged with 10 lb. of caustic and 10 lb. of sodium metasilicate. The temperature is maintained at 110 deg. F. Tank 2 (700 gal.) is charged with 75 lb. of caustic and 25 lb. of sodium metasilicate, the temperature being held around 140 deg. Tank 1 is drained and recharged every third day, while 5 lb. each of caustic and metasilicate are added on the other days. Tank 2 is allowed to run 28 days before draining and recharging. Daily make up in this second tank is about 7 lb. each of caustic and metasilicate to maintain a total alkali concentration of 1.0 per cent. Tank 3 (210 gal.) holds rinse water only.

IN choosing an alkaline cleanser for cans, consideration must be given to the dissolving effect of the solution upon tin. And it is important that sodium metasilicate has been shown by comprehensive tests on both cans and equipment to be much less destructive toward tin than are other alkalis.

The use of sodium metasilicate in can washing operations is relatively simple. With a Rice and Adams washer, 1 lb. of metasilicate is added to the water in the solution tank at the beginning of operation, and 1 lb. is used as make-up for every 50 cans washed. The temperature of the cleaning solution is held at 140 deg. F., and there is no difficulty in producing clean, dry, sweet smelling, commercially sterile cans and covers. At all times the specified quantity of cleanser should be dissolved in a pail of water before it is added to the solution in the washer.

The majority of cream and buttermilk cans were washed in a Creamery Package rotary washer. This machine is charged with 2 lb. of sodium metasilicate to start, and 2 lb. are added for every 100 cans washed. The temperature of the solution is held close to 175 deg. F.

The cleaning operations described in this article may be considered typical, and they should, with slight modifications, prove readily applicable to existing conditions in the majority of dairies and creameries. This, too, applies to the other dairy plant cleaning operations to be described in the next installment.

Table 1: Relative Cost and Effectiveness of Alkali Cleaning Agents

Test No.	Days	Alkalies	Total alkali (lb.)	Pounds used per 1,000 bottles	Cost (cents per 1,000 bottles)	Average plate counts* Before Cleaning	Average plate counts* After Cleaning
1	21	Compound A	1,200	1.43	5.788	65	0
		Sodium metasilicate	40	.05			
2	21	Sodium metasilicate	1,600	1.90	6.828	2	0
		Caustic	440	.52			
3	21	Sodium metasilicate	920	1.09	4.154	28	0
		Caustic	320	.38			
4	21	Sodium metasilicate	760	.90	4.028	16	0
		Caustic	440	.52			
5	28	Compound A	1,520	1.36	5.372	32	0
6	28	Sodium metasilicate	2,040	1.82	6.749	0	0
		Caustic	640	.57			
7	28	Sodium metasilicate	760	.68	3.470	42	2
		Caustic	600	.54			
8	28	Sodium metasilicate	880	.79	3.865	22	0
		Caustic	640	.57			
9	29	Compound A	1,480	1.27	5.016	128	0
10	21	Sodium metasilicate	760	.90	4.318	96	0
		Caustic	520	.62			
11	28	Sodium metasilicate	840	.75	3.753	12	2
		Caustic	640	.57			
12	26	Trisodium phosphate	2,120	2.03	5.278	0	0
13	21	Compound A	1,120	1.33	5.253	26	3
14	22	Sodium metasilicate	680	.77	3.867	8	0
		Caustic	520	.59			
15	34	Sodium metasilicate	880	.65	3.647	14	0
		Caustic	860	.63			
16	34	Compound B	1,060	.78	3.900	10	0
17	28	Caustic	700	.625			
		Compound C	640	.57	5.518	82	0
18	28	Caustic	700	.625			
		TSP	880	.79	3.867	30	0
19	28	Sodium metasilicate	640	.57	3.409	22	0
		Caustic	700	.625			

*Quart bottles.

Table 1: Appendix

Compound	Composition	Per Cent
A	NaOH	76
	Na_2CO_3	17
	$Na_2SiO_3 . 5H_2O$	5
B	NaOH	94
	TSP	6
C	$Na_3PO_4 . 9.5H_2O$	93
	$NaHCO_3$	4
	Na silicate	2

Salt Family Redressed. As part of a large-scale package redesign program which will give all its containers a family resemblance, International Salt Co., Inc., New York, N. Y., has introduced a number of new packages. That these containers have a common resemblance while maintaining individuality is seen in the accompanying illustrations, which show four recently put on the market. Each of these has at the bottom a "block" which identifies the product and the manufacturer. Above this appears the brand name in distinctive lettering on a spacious background.

Nor is art all that has been incorporated in these packages. Attention has been paid to product protection and consumer convenience.

On this page: Four members of the new family of packages created by International Salt Co., New York, N. Y. These new containers have been so treated as to endow them with individuallty and yet give them a common resemblance, thereby multiplying the effect of the company's advertising. The four shown here are for table salt, ice cream salt, sausage seasoning and smoke salt. Their design is part of a big package modernization program by International.

FOOD PACKAGES

The Sterling carton not only is sealed with a tight-wrapped paper wrapper, but it is water-proofed with an asphaltum lining to assure "free running" under any climatic conditions. In the matter of consumer convenience, the carton carries a metal pouring spout which opens on the side instead of in the top. This permits pouring without turning the box completely upside down and makes it easier to observe the operation. As to colors, the wrapper is printed in two shades of blue.

The package for Retsof Ice Cream Salt, a rock salt product, is shown with the top flaps open. As it leaves the production line with these flaps sealed down, the U-shaped cut exposes a perforated, circular push-out section. This device permits pouring without tearing open the carton. The box is of heavy paperboard material and the color combination is red, white and blue.

The containers for the Smoke Salt and Seasoning for Sausage are of paperboard with metal ends. Each has a friction type closure and both embody the colors: yellow, blue, white and red, with the metal ends in gold.

Dainty Dot Design. Designed to add a touch of color to the kitchen, the spice containers of Millbrook Products Co., Somerville, Mass., are attractively novel. Made of paperboard with metal ends, the containers are tight wrapped with an all-over label. The wrapper carries a wide center band and narrow end bands, these being printed in different colors to distinguish the various products. Between the bands, the light background is speckled with pin dots which cleverly suggest the brand name, Dainty Dot. The containers for black pepper, ground cloves, mustard seed and ground cinnamon have both shaker perforations and a pouring hole in the top. Those for ground fancy sage and ground ginger have a friction type closure. This package won the silver-medal award in the fiber can group in the All-American Package Competition.

Relish and Preserves. Two new modern packages, one for relishes and the other for preserves, will carry to consumers this summer the products of Kirgan's Arcadia Farms, Inc., Cincinnati. A tall, wide-mouthed jar with gently curving sides, the relish container has a bright red closure and a smart label in black, red, gold and white. Of horizontal-band and block design, the label contrasts attractively with the vari-colored product. A neck label with a band of black completes the design. Supplementing this container in getting sales is a cardboard display basket into the back of which fits a three-wing, full-color display card. Holding about a dozen jars, this display unit puts the package out where the customer can examine it and serve herself. It has been found to increase sales greatly wherever used.

The other new Arcadia container, the one for preserves, is a jar resembling a miniature goldfish bowl. Its only label is a thin neck band. Originally, the label was placed on the bottom so that it did not show at all, making the container practical for table use even on the best occasions. This was unsatisfactory, however, the package having no display value.

Naked Appeal. For its Richmere milk-chocolate bar, Rockwood & Co., Brooklyn, N. Y., has adopted a wrapper which takes advantage of the candy's appetite appeal. Of transparent cellulose, the wrapper is printed in red and white, with a band along the bottom edge, and it is cold-sealed to make it airtight. Made of chocolate milled to a very fine texture and containing generous amounts of milk, the confection has a light, enticing color. The bar is sufficiently

heavy to be packaged without a backcard, and it has the manufacturer's name molded into it.

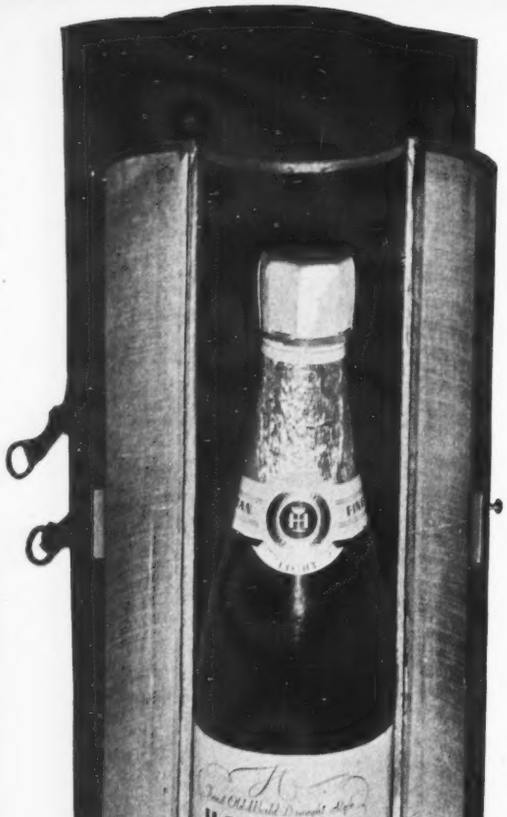
Cheese Popcorn. To create a new outlet for its cheese, Kraft-Phenix Cheese Corp., Chicago, has developed a cheese-flavored popcorn. Applied by a special process, the cheese gives the corn a golden yellow color and a distinct taste. In distributing this product, the big problem was to find an inexpensive package which would resist the damaging effects of moisture, and at the same time display its contents. After many tests, the company adopted a single-walled tube of No. 300 moistureproof Cellophane, heat-sealed at each end, semi-automatically, on a crimping machine. This type of container is said to be exceptionally moisture-tight, surpassing transparent cellulose bags in that respect. This new form of popcorn, called O-Ke-Doke, is marketed by licensed distributors who also produce the product. The bulk of the package makes distant shipment impractical and expensive.

Apple Butter Art. Streamline design and an effective combination of colors have been incorporated in the apple butter package of National Fruit Products Co., Washington, D. C. Curved slightly along the sides and tapering gently toward the bottom, the container has an appearance of size. The jar has vertical ridges on either side of the label, and the color of the product shows through in contrast with the label and the closure. Owens-Illinois Glass Co. makes the container.

Light Containers. Two purposes are accomplished by one idea in the vinegar and syrup bottle used by Wellman-Peck Co., San Francisco. The vinegar jug can be reused as a lamp base, and a label on the jug suggests that it be filled with water colored with Wellman food color. To make this conversion easy, parts for the lamp are available in a unit package through the grocer. An important feature of the jug in view of its reuse possibilities is the plain neck, permitted by the cork closure. The syrup bottle is designed for reuse as a candlestick, it, too, having a neck free of threads. Lacquer applied to this container makes it decorative.

Fudge-Pan Package. New ideas in packaging do not always work, but one recently introduced by E. & A. Opler, Inc., Chicago, undoubtedly has gone over. This package, a baking-chocolate, fudge-pan combination, not only has enjoyed a tremendous volume of sales, but it recently was picked for the gold-medal award in the miscellaneous group of the All-America Package Competition. The package comprises two ½-lb. bars of chocolate wrapped in metal foil, enclosed in cardboard cartons and held in the

FOOD PACKAGES



fudge pan by a lithographed paper band. The designer developed this package to create impulse purchases and bring the product off the shelf onto the display table. He also tied the product up with an item, the fudge pan, which would promote greater consumption, and he provided the distributor with a package he could use in feature advertising and sales.

Brazil Bar. A new bar confection, "Brazils and Chocolate," recently was introduced in New England by San Man Chocolates Co., Boston. This bar consists of a strip of caramel with two small, whole Brazil nuts on top, the entire unit being chocolate covered. There are two pieces to a package in an attractive transparent cellulose wrapper.

High Visibility. Packages which make good use of the appetizing appearance of their contents are being used for Mission brand dried fruits packed by Guggenheim & Co., San Francisco. The fruits are wrapped in transparent cellulose on which is printed the necessary label information and an attractive trade mark. Neat, horizontal bands also decorate the wrapper. These packages received the bronze medal award in the transparent-pack group of the All-American Package Competition for clever design and space-saving qualities.

Aids Beer Salesmen. Not content with creating an unusually attractive bottle for its beer, the Hoffman Beverage Co., Newark, N. J., designed for it a most attractive cylindrical case to aid salesmen in gaining outlets. This case, which accommodates one bottle, has a double hinged door which opens to show the full length of the bottle and which is held closed by a hook-over, elastic fastener. Made of heavy paperboard, the container is covered with brown suede paper. The ends are in gold, as is the band underneath the fastener. Inside, the doors are covered with a paper which gives a wood-veneer effect.

Big Little Changes. Increased shelf and display visibility have been incorporated in the redesigned carton for Swans Down cake flour distributed by General Foods Corp., New York. Using essentially the same label elements as before, refinements have been made to improve appearance and sales appeal. The front panel is in brighter red and occupies a larger area. The yellow copy section has shrunk to give greater prominence to the white-swan trade-mark. In addition to being neater in appearance, this container has greater apparent size.

Now It's Banana Bread. In an effort to build sales through specialty products, bakers have been introducing many new kinds of bread. Newest of these is banana bread, in which five to ten per cent of the normal flour content of the dough is replaced with fresh, whole-fruit bananas. This bread is moist and delicately flavored and has an appetizing light-brown color. The product is credited with a crisp crust, tender crumb, even texture, fine grain and good keeping quality. The bananas replace part or all of the liquid used and furnish acid to react with the soda.

Sanitary Sausagette. The "untouched-by-human-hands" appeal for foods is being capitalized upon by Henry Pfeifer, Inc., Newark, N. J. This company has added to its line of Tasty meat products a new "untouched" fresh-flavor sausagette. The meat is packed in a box covered with a moistureproof, transparent-cellulose lid. Each package contains ½ lb., enough for one meal for the average family.

New Use for Vacuum. To provide greater product protection and furnish a container which may be opened without spilling the contents, Richmond Maid baking powder has been put into a vacuum-pack, key-opening can. The pure phosphate baking powder, packed in this manner, has a shelf-life of many years, it is said, and the product is credited with a leavening strength over 20 per cent above government standards.

Birth of the Birds. From jelly egg to jolly bird was the theme of the package for Warwick jelly beans, sold in Great Atlantic & Pacific Tea stores for Easter. On one side of the box was the likeness of a bird's nest in the bottom of which was a transparent cellulose window showing the varicolored jelly eggs as if they were in the nest. The other side pictured a nest with three chirping birdlings, apparently hatched from the eggs. A

colorful package, it caught the Easter spirit. Robert Gair Co., Inc., New York, created the design.

Laminated Biscuit Box. New and attractively printed paperboard packages have replaced the tin packages with paper wrapper for the 3- and 5-lb. units of English biscuits distributed by George Weston, Ltd., Passaic, N. J. Of heavy laminated stock, the paperboard has a fine surface for printing and is lined with kraft. An asphalt film makes it moisture resistant. Formed from one piece, the carton is stapled on one corner of the body and on the front corners of the lid. The bottom flaps are glued, the top is loose.

Rice That Pours. Why didn't someone think of it before. That's the housewife's first reaction to the new package adopted for the Rose brand rice put up by Schiff-Lang Corp. for American Rice Milling Co., Crowley, La. A round carton, the container has a metal pouring spout in the top like a salt box. The carton, too, has a dramatic label design and effective color combination, dark blue lettering appearing against a lighter blue background with white forming a general background. Another design, used on the package for the quick-cooking variety, is developed in red with black lettering and a white background. The cartons contain 2 lb.

Mayonnaise Appeal. To introduce its new jars of Table Garden salad dressing, the Wheatley Mayonnaise Co., Louisville, Ky., selected a package which embodies three separate elements of beauty. The jar itself is of pleasing shape and attractive design and it displays to advantage the color of its contents. The label, too, has eye appeal and is of novel shape; but the cap, lithographed in two colors with narrow bands radiating from the center, is the outstanding feature. The cap is by Closure Service Co.; the container by Owens-Illinois Glass Co.

Successful packaging of foods for freezing by the Birdseye process depends upon cartons of patented design made from cold water waxed bleached sulphite-manila bending board.

PAPER CARTONS

Greater protection to contents, greater aid to merchandising, and enhanced convenience for use characterize progress in paper food packages during past five years.

PROGRESS during the past five years in paper box containers for foods has centered around the folding carton type because of its low cost and of its flexibility in construction, design and adaptability for use as a "production package"—a package handled on automatic filling and closing machines.

Much of this progress has been to give greater protection to the contents, to increase effectiveness in merchandising, and to make for convenience in the kitchen and pantry.

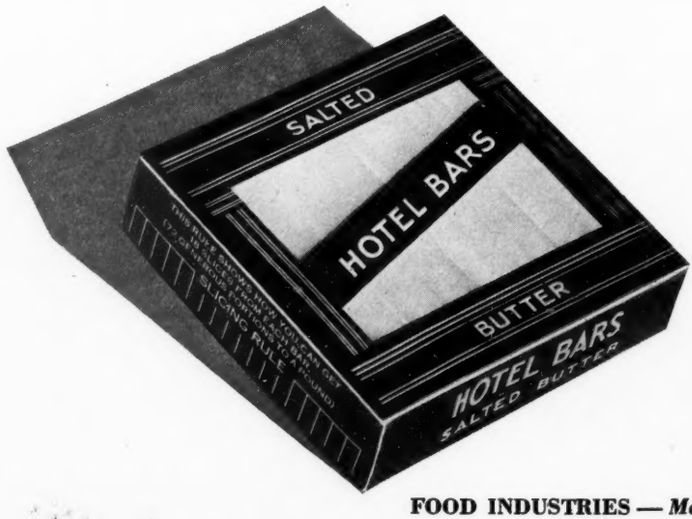
In the case of product protection, merchandising value, and appearance, this progress has been dependent upon the development of better bending boards, of better adhesives, of transparent sheet materials for windows, of quicker drying and more brilliant inks, and of clear, rapid-drying varnishes. Conveniences, on the other hand, are embodied in those features which permit of economical use of available shelf space, of reclosure to prevent undue deterioration and to keep out dust, and of emptying through a pouring or a measuring spout which also may have reclosure value or serve as a sifting or screening device.

Folding cartons are made largely from bending chipboard, single or bleached manila, or patent coated stock. Improvements in the art of papermaking have resulted in boards free from any odor or taste that might be imparted to the contents of the cartons. Folding boards lined with vegetable parchment or glassine are commonly used when the product has high fat content. They are also coated with silicate or a latex compound to increase their grease resistance, whereas boards coated with wax either by the cold water process or by the hot dry process are used when moisture is present. When it is desired to prevent the transfer of moisture into or out of the package, a laminated board having a film of odorless and tasteless asphalt between plies is used. Cartons from this type of board are widely used in the baking industry, especially for cracker caddies. More recently it is being used for one- and two-pound sugar cartons.

Other recent improvements in folding boards used in the cold water wax process have been obtained by the greater use of bleached sulphite liners on both sides and solid sulphite or solid manila fillers. This type of board is not only increased in strength, but also has better general appearance and printing qualities. Examples of these two boards are found in the Birdseye frozen food packages made by Robert Gair Co., Inc., New York, N. Y., and Russell Box Co., Medford, Mass., and the butter, lard, and fat compound cartons made by Menasha Products Co., Menasha, Wis.

UNTIL within the past year, it has not been possible to make a board to a definite formula so that it could be duplicated exactly as desired. Now the board is being manufactured with uniformity as to surface absorption, caliper, bending quality, and finish on which exact duplication of printing and color effects may be obtained.

In addition to these protective qualities and reproducible multi-color printing and lithographing, additional



merchandising value is obtained by the use of transparent sheet materials. In some instances, the products such as cakes, pretzels, confections, and pies are bagged or wrapped in these transparent materials and packaged in an open topped or open panelled folding carton. The results are, a saving in the cost of the carton itself, when the blank can be cut from a board with a saving in the board used, and a display of the cakes, pie or whatever is in the carton. Through careful selection of colors used on the carton, to blend with the color of the product, a harmonious ensemble is obtainable for effective display purposes.

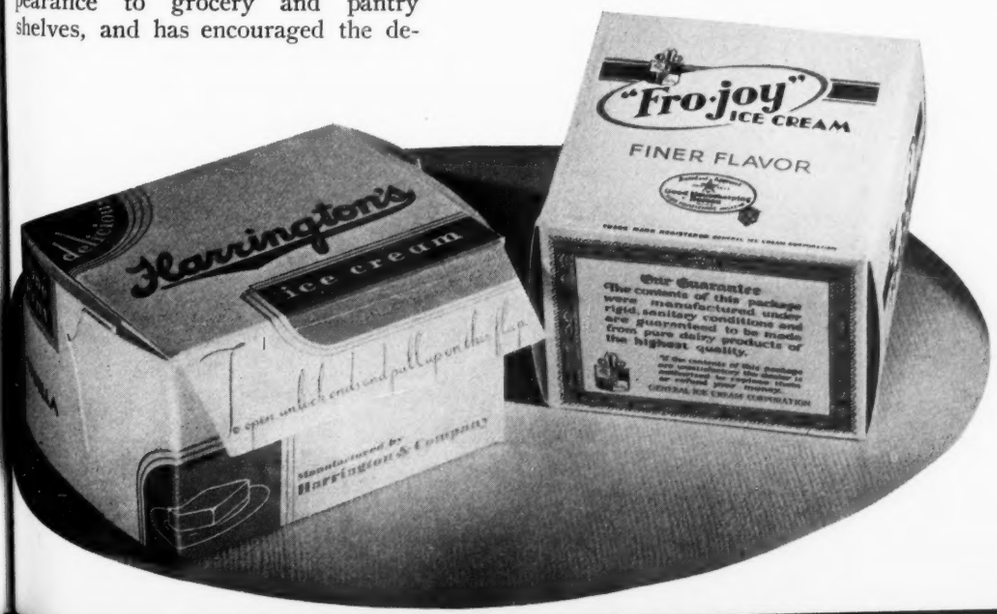
Another means of getting effective merchandising results is through the use of transparent windows through which can be seen the actual contents of the packages. This method permits consumer inspection even though the package may be fully sealed. Special adhesives for affixing these windows to the plain or waxed cardboard have made this feature possible. First attempts were made with highly transparent glassine, but the cellulose acetate type of transparent material has proved most effective because of its resistance to temperature and humidity changes to which the package may be subjected. The viscose type of transparent materials are sometimes used for this purpose, even though they are more readily affected by changing atmospheric conditions.

Better merchandising is being obtained through the adoption of family packages in which the similarity of design or coloring of the packages enable one or two well-known leaders to attract a larger consumer demand for the lesser known products of a company. Recent years have seen an increasing use of folding cartons for this purpose. This family package idea has given more attractive appearance to grocery and pantry shelves, and has encouraged the designing of cartons for more economical use of available shelf space.

Less than five years ago, apartment and small-kitchen house residents became quite vocal in their criticism of carton packages for foods without reclosure means which would permit stacking opened packages on top of each other to make better use of the limited shelf space and would help

Right: An effective application of transparent sheet materials is found in window cartons which aid in merchandising by enabling the prospective buyer to inspect the contents of the package without breaking the seals.

Above: Although not cartons in a strict sense of the term, display and protective cake and pie packages of the above type, made by Chippewa Paper Products, Inc., Chicago, Ill., are of comparatively recent adoption.



Above: Open top folding cartons have found wide use with cakes wrapped in transparent celluloses. Very attractive ensemble effects are frequently obtained by selecting decorative color patterns which blend harmoniously with the color of the cake.

Left and far left: Quite recently cartons with and without window cutouts and made from extra white board composed of bleached sulphite liners on both sides and solid manila filler have been adopted for dairy and high fat products.

to keep the contents of the packages in their original quality state for a longer period of time. The result has been the introduction of closure features ranging from the simple perforation of three sides of a production package carton, which is opened by pressing the carton with thumb and fingers along the perforated line, leaving the fourth side of the carton to serve as a hinge to much more complicated constructions. This construction permits the return of the carton top to its original position as soon as released and serves to help hold it in a closed position. A more complicated reclosure feature is found in the Daller specialty carton now being used by the Corn Products Refining Co. for its Argo starch.

Other adaptations of the reclosure feature in production cartons are found in the Snow King Baking Soda package designed by the United States Printing & Lithographing Co., Cincinnati, Ohio; the A. & P. Nectar tea package by Robert Gair Co., New York, N. Y.; the salt, cereal, sugar, and similar product packages fitted with the aluminum pouring and closing spout of the American Aluminum Ware Co., Newark, N. J., and cartons just now going onto the market with the P-A-K Corporation, Chicago, Ill., measuring or dispensing device which serves as a reclosure as well as means of measuring out the exact quantity of product desired from the container. These devices are of much convenience to the housewife in keeping the contents of the carton in more attractive condition, in getting maximum use of her available shelf space, and in making the contents of the cartons readily accessible.

OTHER evidences of progress in folding carton construction and design could be dwelt upon, but from the information supplied us by carton and accessory manufacturers it is apparent that the features herein discussed are the most notable ones. Brief mention is in order concerning the development and increasing use of better printing and lithographing inks to provide more attractive packages; and concerning the use of clear varnishes on the exterior of packages to give them a dressy appearance without the expense of an outside transparent wrapper.

Finally, cartons which serve both as containers for individually wrapped or packaged units and as counter display boxes or dispensers have become widely used during the past five years. Their use has not been as general with foods as with non-food commodities, however.

Editor's Note: With this article, FOOD INDUSTRIES' *review of five years of progress in food packaging is completed. Other subjects included in the review were metal foils, collapsible tubes, glass containers, steel containers, closures, wrappings, paper containers, and tin containers in* FOOD INDUSTRIES *for March, 1935; and paper bags, non-metal shipping containers, plastics, and adhesives in* FOOD INDUSTRIES *for April, 1935.*

Right and below: Spout pouring and reclosure features of food-containing cartons take a variety of forms. Only two of several types are shown in this illustration.

Lower right: Frequently folding cartons are used as display containers for smaller folding cartons containing the food product. Improvements in inks and the use of clear, quick-drying varnishes heighten the appearance of both small and large cartons.

PROMOTING *the Product . . .*

▶ INSTITUTE OF AMERICAN MEAT PACKERS, through its sausage division, will conduct from May 6 to June 2 a "get acquainted with" sausage and ready-to-serve meats campaign. Window displays, counter cards, dealer ads, a recipe book and newspaper and magazine articles will be used.

▶ FISH AND SEA FOOD INSTITUTE has approved a budget of $50,000 for a national "eat more fish" drive. Mutual Fish Dealers Association, Inc., New York, is raising a fund of $55,000 for promotion in the metropolitan area.

▶ AMERICAN CONE & PRETZEL CO., Philadelphia, is offering in a combination deal with a box of pretzels a novel variation of the game of quoits. Lithographed and varnished cut-out reproductions of pretzels are substituted for the quoits.

▶ ARMOUR & Co. will tie up with the new motion picture, "Misssissippi," in an elaborate advertising campaign. This drive features associated-item selling by dealers. The plan is made available to Armour customers in a regular monthly store promotion around which the dealer can build a localized selling program.

▶ WILSON & Co. has consolidated the three activities of sales promotion, advertising and publicity into one sales-promotion department.

▶ INDEPENDENT GROCER'S ALLIANCE OF AMERICA, Chicago, has announced a campaign to stimulate the sale of flour from coast to coast. A talking motion picture, "Flour Profits," shown at retailer meetings, is a principal factor in the campaign. This film gives the story of flour from mill to consumer.

▶ BRAZIL NUT ADVERTISING FUND has undertaken experimental work to develop new and improved uses for Brazil nuts in commercial confections.

▶ HARDING CREAM CO., Omaha, is giving a marble with each ice cream cone. Children accumulating a certain number of marbles will receive a more valuable prize.

▶ UNITED STATES BREWERS' ASSOCIATION, New York, has gotten under way with a cooperative campaign in which members advertise the nutritious qualities of beer instead of stating that their beverage is the only one fit to drink.

▶ BEST FOODS, INC., New York, will use about 100 newspapers throughout the country in its spring campaign on mayonnaise. Copy will be based on the theme, "real mayonnaise," with the slogan, "double whipped."

▶ PAGE DAIRY CO., Toledo, has increased the sale of its butter at the expense of the cheaper roll-type product by advertising on its milk bottles. The ads are applied in color, the letters being fused into the glass.

▶ NATIONAL FOODS INC., Chicago, is introducing Mickey Mouse Kiddie Malt with a clever merchandising scheme. Each package carries "surprise stickers" to be pasted on the bottom of the child's glass so that he must empty it to see the picture. Another feature is a health chart enabling the child to keep a daily record of the number of glasses he drinks.

▶ KRAFT-PHENIX, Chicago, has resumed the Kraft Music Hall, a national radio program advertising mayonnaise products.

▶ NORTHWEST apple interests have started a $75,000 advertising campaign to promote boxed apples from the 1934 crop.

▶ GENERAL FOODS CORP. went on the air April 29 with a new five-times-a-week, coast-to-coast radio show, advertising Post Toasties and Post's 40 Per Cent Bran Flakes on alternate weeks. The program, entitled "Tony and Gus," combines music, drama and humor.

▶ BORDEN CO., New York, will continue, at least until the end of June, the radio program featuring Beatrice Lillie.

▶ FOCKE PACKING CO., Dayton, recently held an "open house" to acquaint the public with new methods for the sanitary handling and packaging of meats and with its new meat products.

▶ NEW YORK STATE recently passed a bill appropriating $400,000 for continuance of the "drink more milk" campaign.

▶ STANDARD BRANDS, INC., now is promoting Chase & Sanborn coffee through the amateur hour of Major Edward Bowes, broadcast on Sunday evenings. The company also has inaugurated a Wednesday broadcast over a WEAF-NBC network to promote Tender Leaf tea. The program, a drama, is entitled, "One Man's Family."

Continental Can Co. will use throughout 1935 full-page color advertisements in the "Saturday Evening Post," "Time," and "Good Housekeeping," a total circulation of 6,000,000. Above is a section of a forthcoming ad showing a phantom can superimposed upon a delicious dinner. The theme of this and other ads is "health and freshness sealed in cans."

▶ LEXINGTON (KY.) ROLLING MILLS CO. now is dating its flour, replacing bags kept in stock more than a reasonable length of time.

▶ NATIONAL DAIRY PRODUCTS CORP. and its 41 ice cream subsidiaries, will expend this year on advertising and sales promotion about $1,500,000. Dealer help in the way of window displays, a consumer folder and window trims will be employed. "Quality control" will be the theme, the company using laboratories in important cities for testing.

▶ ONE of the bright ideas recently developed out on the Pacific Coast is an album of beautiful color photographs of frozen desserts. The idea is to have one album at each retail outlet. Each of the more or less complex desserts is shown exactly as it will appear on the dinner table and is so carefully identified by a number that a hostess can be absolutely certain of what she is ordering.

Freedom from Moisture Preserves Quality

Accessory materials used by food manufacturers, such as colors, flavors, gums, leavens and malts should be kept dry to prevent mold growth and deterioration.

By **HARRY STINER**
Los Angeles, Calif.

THIS article is the fifth and concluding one in a series dealing with the shipping and storage of the raw materials used by food manufacturers. Preceding articles in this series appeared in FOOD INDUSTRIES for January, February, March and April, 1935. This article deals with gums, colors, flavors, leavens, malts, syrups and preserves. For all of these materials, particular care must be taken to prevent exposure to moist conditions.

Gums

CONTAINERS

Agar agar is packed in burlap bags, bound with wooden slats.

Apple and citrus pectins are shipped in fiberboard barrels.

Dextrin, gum arabic, gum dextrin and tapioca dextrin are generally received in heavy cotton bags.

Gelatin is packed in paper-lined slack-coopered barrels and fiberboard barrels.

Gum tragacanth is shipped in paper-lined wooden boxes.

SHIPPING

Gums, dextrins and gelatin should be transported in clean, dry vehicles at prevailing temperatures. If the containers are damaged or show signs of moisture when delivered, their contents should be promptly and thoroughly examined.

STORAGE

Gum materials should be stored in a cool, dry place. Avoid standing any of the containers on a damp floor. All bags should be placed on skids. Cold rooms are seldom dry enough for the safe storage of these materials. After opening, or if likely to become infested, place in cold storage.

PEST CONTROL

Materials of this type are seldom bothered by insects. Some, however, including dextrins and gelatin, are attacked by storage mites if in contact with moist, infested material, or sometimes even in damp air. Although storage mites are microscopic, their presence, when in sufficient numbers, is always made evident by the accumulation of a brown dust. Materials that are intended for food should be immediately destroyed when found to be infested with mites and all the surrounding area should be thoroughly treated with the roach spray described in FOOD INDUSTRIES for March, 1934, Page 113.

When gums, dextrins, or gelatins become wet they form into hard, unworkable lumps. While still apparently dry, these lumps will often contain enough moisture to render them unusable because of molding. These commodities should always be inspected when lumpy, and any moldy portions discarded.

Colorings

CONTAINERS

Dry colorings are packed in metal containers.

Liquid colorings are packed in bottles in wooden boxes, or in cans in fiberboard boxes.

Plastic colors are shipped in fiberboard boxes.

SHIPPING

Colorings should be shipped in clean, dry vehicles at prevailing temperatures. Containers that are soiled, damaged or leaking should be examined at once.

STORAGE

All colorings should be stored in a cool, dry place. For long holding, however, plastic colorings should be kept in a medium moist atmosphere such as a cold room to prevent their drying out. Liquid coloring containers should always be kept covered, otherwise they may evaporate down and become too concentrated.

PEST CONTROL

Colorings are not troubled by pests except where they may wander into open containers.

Flavorings

CONTAINERS

Liquid flavorings are packed in bottles in wooden boxes, or in cans in fiberboard boxes.

Powdered or crystalline flavorings come in tin cans packed in fiberboard boxes.

Nonpareil seeds are packed in paper-lined boxes or barrels.

Licorice is packed in wooden boxes.

Caraway, celery, poppy, sesame, vanilla beans, coffee berries and similar seeds are received in jute bags.

Salt is packed in heavy cotton bags.

Vinegar is packed in tight-coopered barrels.

SHIPPING

All flavorings may be shipped in clean, dry vehicles at prevailing temperatures. Liquid and powdered forms should be checked for leakage or container damage when received. Other flavorings should be examined for moisture, damage and infestation.

STORAGE

Liquid and powdered flavorings and Nonpareil seeds may be stored in a cool, dry place but should always be kept tightly covered. Seeds and licorice may be held in ordinary storage, but when not in insect-proof containers should be examined fre-

quently for infestation. Seeds and licorice may also be held in cold storage if desired. Salt should be kept in a dry place.

PEST CONTROL

Liquid and powdered flavorings are not troubled by pests when properly sealed. Nonpareil seeds and licorice, as well as all of the plant seeds listed, are subject to infestation by storage pests of several types, also to damage from moisture, and should be examined frequently when in normal storage.

Infested materials may be fumigated with any of the gases listed under No. 8, FOOD INDUSTRIES, April 1934, Page 160, except sulphur. The plant seeds listed may also be treated with heat as described under No. 9 (above reference). When the infested materials are such that they cannot be thoroughly cleaned after treating they should be destroyed. Leaking vinegar barrels provide an excellent attraction and breeding place for pomace flies and vinegar mites, which may later spread to all parts of the plant. They are usually treated with a fumigant spray (see reference above), or a fly spray (see FOOD INDUSTRIES, March, 1934, Page 113).

Excess moisture causes deterioration of Nonpareil seeds and licorice. It also causes plant seeds to mold as well as increases their attraction to insects. Moldy materials are unfit for use and should be destroyed.

Leavens

CONTAINERS

Ammonium bicarbonate, cream of tartar, tartaric acid and similar products are shipped in paper-lined, tight-coopered kegs or barrels.

Citric acid and alum are packed in paper-lined kegs or boxes.

Yeast foods are received in paper-lined jute bags.

Sodium bicarbonate is shipped in paper-lined slack-coopered barrels.

Yeast is shipped in fiberboard boxes.

SHIPPING

All leavens except compressed or liquid yeast may be shipped in clean, dry vehicles at ordinary temperatures. Soft and liquid yeasts should always be held under constant refrigeration, below 35 deg. F., during shipping.

STORAGE

Leavens, except liquid and compressed yeast, may be stored safely in a cool dry place, but the containers must always be kept tightly covered when not in use. This is particularly so with ammonium bicarbonate, as it rapidly loses its ammonium content when exposed to the air. Also, this material should not be stored near other materials that may be affected by its fumes.

Compressed and liquid yeasts may be considered as being composed mainly of delicate living organisms which are quickly destroyed by putrefactive organisms unless protected by low temperatures. Not more than one or two day's supply of these yeasts should be carried in stock, and what is in stock should be held between 32 and 34 deg. F.

PEST CONTROL

Barring the yeasts and yeast food, leavens are seldom attacked by insects or rodents, although they may wander into open containers and there die. Yeasts are attacked by rodents at all temperatures.

Malts

CONTAINERS

Malt diastase and malt syrup are shipped in tight-coopered barrels.

Malt extract is packed in tight-coopered barrels lined with silicate of soda.

Powdered malt is shipped in paper-lined, slack-coopered barrels.

SHIPPING

Malts should be shipped in clean, dry vehicles at ordinary temperatures. Loss from breakage or otherwise from handling in transit should be promptly checked.

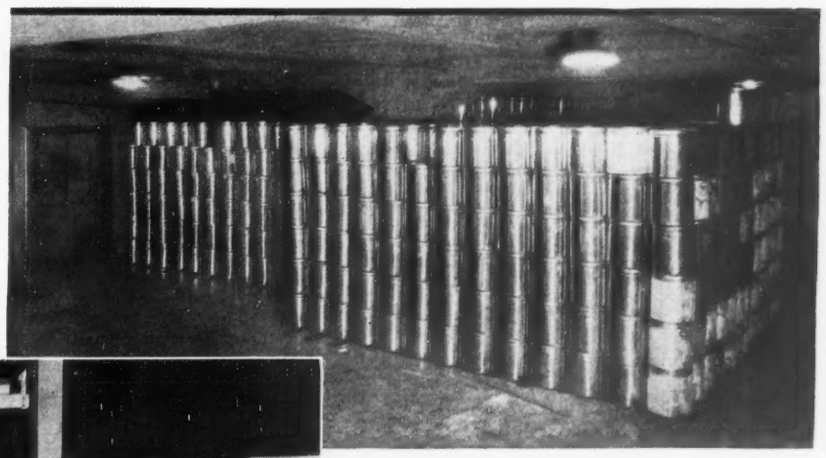
STORAGE

Malts should be stored at 50 deg. F., if reasonably dry. For best results the variation from this temperature should not be great. Powdered malt must be protected from moisture at all times.

PEST CONTROL

When properly sealed and stored, liquid malts will keep indefinitely, but

(Turn to page 260)



Orange pulp in cans, stored in a refrigerated storeroom.

Refrigerated storeroom for open boxes of preserved fruits, providing protection from infestation and preventing the fruit from drying out too rapidly.

Trucks Offer Advantages in
Overland Food Shipments

Butter, eggs, poultry, frozen fish, oysters and live stock now move over roads with advantages of time and cost compared with rail hauls

One of the Mack tractor and refrigerator semi-trailer units operated by the Spector Motor Service, Inc., in the overland haulage of food products between the Atlantic seaboard and the inland cities of St. Louis and Chicago and way points. Among other foods handled are butter, eggs and poultry going eastward and frozen fish and oysters going westward. Temperatures inside the semi-trailer are maintained at from 25 to 50 deg. F., according to the requirements of the foods being carried.

THE combination of improved hard-surfaced highways, improved high-speed pneumatic-tired trucks of large carrying capacity, and improved refrigerated truck and semi-trailer bodies has resulted in a steadily-increasing movement of food products overland by motor equipment. In fact, the facilities for the shipment of perishable foodstuffs over the road for long distances by truck have become so dependable and, with two-way loads, so economical that the wide-awake traffic managers of food concerns no longer ship by rail without a comparison with motor hauls as to cost, time en route and condition of the product upon delivery.

And yesterday's long hauls seem like just-around-the-corner runs of today. The 200-mile economic limit of trucks of a few years ago is today but a memory with present regularly-run truck routes of 700, 800, 900 and even 1,100 miles, the latter between Denver and Chicago. Regular truck routes of 300, 400 and 500 miles one way are so common as to cause no comment.

Nor are these truck routes restricted to the industrial East or the agricultural West or Mid-West. Charlotte, N. C., to New York City is a one-way truck run of approximately 700 miles. Memphis, Tenn., is 335 truck miles from St. Louis, Mo., and from Buffalo, N. Y., to New York City is 460 miles by road. Then there are truck routes from Salt Lake City, Utah, to San Francisco, 800 truck miles, and to Los Angeles, 750 miles.

Many examples of unusual overland hauls of food products might be cited. During last summer's succession of heat waves, frozen fish and fresh oysters were hauled from the Atlantic seaboard to St. Louis, Mo., a distance of approximately 1,000 miles. These hauls were made by the Spector Motor Service, Inc., St. Louis, Mo., one of whose refrigerated truck units is shown in the accompanying illustration.

The Spector Company has been in business for three years and inaugurated the motor haulage of perishable foodstuffs from Eastern states into St. Louis. Its haulage of frozen fish from the Atlantic seaboard was made for the Meletio Sea Food Co., of St. Louis.

During the past summer the Meletio Company received more than a dozen such shipments, all of which were received in excellent condition despite the extremely hot weather. No trouble was experienced in spoilage, thawing or deterioration.

For the past two years the Spector Company also has hauled frozen fish

and fresh oysters from the Atlantic seaboard to George J. Goettling & Co., of St. Louis. The fish was shipped unboxed and due to the refrigerated bodies employed, was received in perfect condition even during the hottest summer weather with temperatures ranging from 100 to 110 deg. F.

The temperature maintained in the truck and trailer bodies is governed by the commodity being hauled. For instance, butter requires a temperature of from 40 to 50 deg. F. Poultry must be kept at from 25 to 40 deg. F., depending upon whether it is frozen, chilled or fresh. Practically all of the Spector bodies are equipped with outside indicators with the thermometer bulbs on the inside.

Each of the bodies is equipped with ice bunkers that are large enough to permit carrying sufficient dry ice to keep the loads at the proper temperatures. A fan, driven from the truck or tractor battery, is also provided inside each body to circulate the air and maintain an even temperature at top and bottom of the body interior. Some of the Spector semi-trailers can carry at one time 400 cases of shell eggs, which is the equivalent of a freight car load.

In common with other reputable truck lines which carry full insurance covering the loads and public liability and property damage, the advantages offered the perishable food shippers by the Spector Company in comparison with rail hauls are less time in transit, as good or better condition of the goods on delivery and as low or lower net costs.

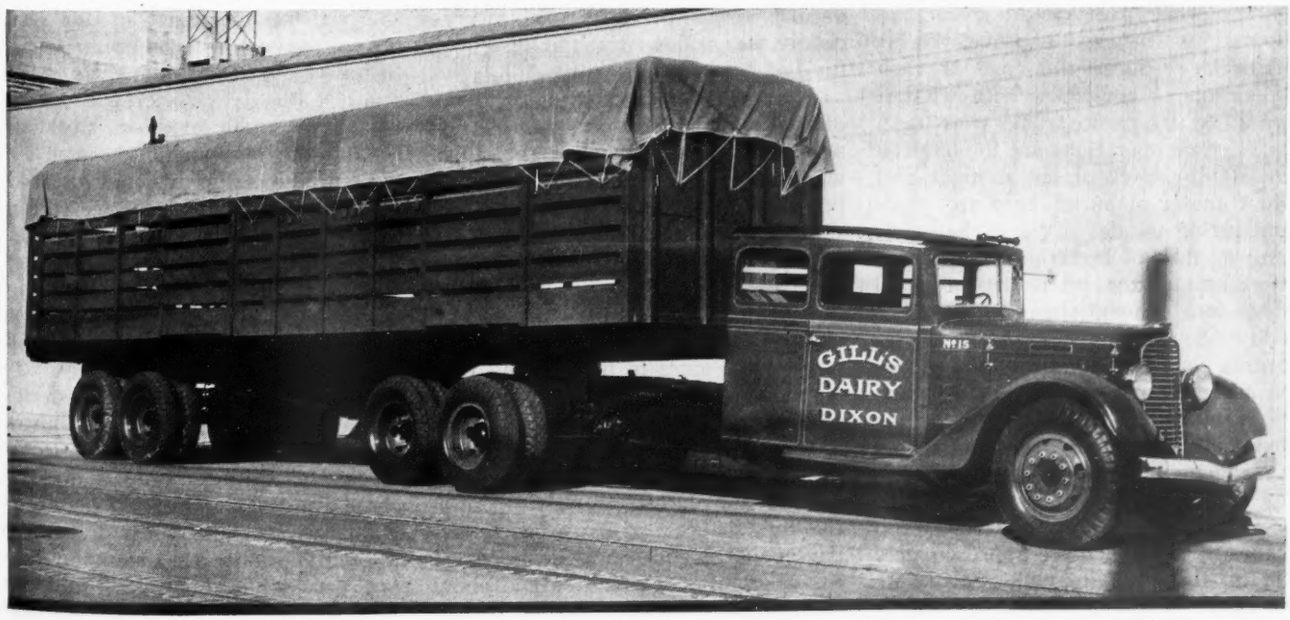
With practically the same base rate between cities for commodities not lower than fourth class, the net cost via truck is often less than by rail. This is due in part to the ability of the truck to make store door pick-up and delivery without additional cost. Until recently and now, except for some few railroads which provide store door delivery, goods shipped by rail had to be handled by truckers at each end of the route. These cartage charges of course had to be paid by the shipper and, added to the rail rates, resulted in a higher net cost than the more direct haul from door of consignor to that of consignee.

IN the case of the Spector Company, its runs are covered in less time than by the railroads. This is true on many other regular truck routes. For example, the Charlotte, N. C., truck run to New York City previously mentioned is made in 40 hours as compared with five days by rail. The New York City to Buffalo route is covered by truck in twenty hours as compared with two days for rail freight. Going farther west, several truck lines make the 1,100 mile run between Chicago and Denver in 45 hours as compared with three days by rail. Going still farther west, truck runs between Salt Lake City, Utah, and San Francisco and Los Angeles are each made in 36 hours as compared with three days by rail.

On shorter runs, the advantage also lies with the motor trucker, in many cases to an even greater degree than on the long routes over 500 miles. For example, by rail it takes perishable foods 36 hours to travel between Chicago and Minneapolis, a distance of 400 miles. There are several motor haulers covering this route in eighteen hours running time. From Chicago into Iowa to cities such as Des Moines and Waterloo, truck runs are scheduled in sixteen hours as compared with 36 hours by rail.

Going into the economics of the long haul, it seems that the motor hauler is bound by the same fundamentals as the railroad. The longer the truck haul, the less is the proportional cost for overhead, warehousing and pick-ups. From this deduction it would appear that longer haul truck runs can be made on a lower ton-mileage basis than short runs. In turn, this would indicate that the perishable food shipper may expect to ship by truck over longer and longer distances.

In any event, with the intense competition between the two methods of motor and rail shipping, and providing no adverse legislation is passed which would adversely restrict the motor hauler, the perishable foods shipper is in the enviable position of being able to choose that method which gives him the best service at the least cost.

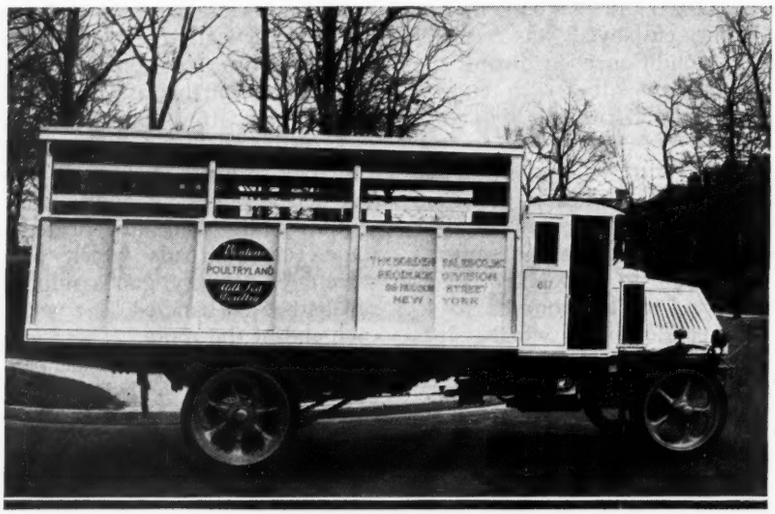


Mounted on eighteen 900x20 balloon tires, this high-speed California overland haulage unit is designed for the long-distance movement of live stock. It can carry thirty head of cattle at one time. With a removable inner floor placed half-way up the body height, it becomes a double decker carrying 320 head of sheep or hogs. The tractor is a Diamond-T. The overall length of the outfit is 52 ft.; the width, 8 ft., and the height, 11 ft. 2 in. It has a maximum carrying capacity of 45,020 lb. and has made round trips of from 800 to 900 miles.

A steel-sided ice body with a canopy top which also is used to haul butter, eggs and poultry

This Two-Purpose Body

Permits Day and Night Truck Use



A new type of dual-purpose body used on a fleet of Mack and Brockway trucks owned by the Produce Division of the Borden Sales Co., Inc., in New York City. The steel sides permit 56 cakes of ice to be carried to the load at night. In the day, the permanent top permits the same truck to haul butter, eggs, and poultry

THE Produce Division of the Borden Sales Co., Inc., has recently reduced its truck transportation costs by the adoption of a dual-purpose body which permits a fleet of heavy-duty Mack and Brockway trucks to work on day and night shifts with two sets of drivers and helpers. With two work shifts, the fixed truck charges, including depreciation; interest on investment; liability and property damage insurance; fire insurance; licenses; taxes and garage rent are spread over two operations instead of one. This naturally reduces the cost of each operation as compared with what it would be if separate trucks were used.

The two operations are the haulage of 300-lb. cakes of ice at night and the transfer of butter, eggs and poultry during the day. While the handling of tubs of butter; cases of shell eggs and boxes of poultry can be done in a conventional rack or panel body, the hauling of cakes of ice requires a special type of body. Hence in the development of the dual-purpose body illustrated herewith, the basic design had to first provide for the adequate handling of the cakes of ice.

In transporting the regulation cakes of ice, which are approximately 11 in. thick, 22 in. wide and 42 in. long, the cakes are stood up on their ends for easy loading and unloading. To prevent shifting and breakage in transit, the width of the body must be such as to accommodate the desired number of cakes, side to side, with not more than an inch clearance combined from one side of the body to the other. Thus, due to the slight movement of the cakes in transit, the outside cakes of ice contact or press against the sides of the body.

BECAUSE of the pressure of the cakes against the body sides when in transit and especially when going around corners, the sides must have lateral strength and are therefore usually made of steel. This procedure was followed in the design of the body shown herewith.

The body carries a total of 56 cakes of ice arranged in crosswise rows of seven cakes each and eight rows lengthwise of the body. At 300 lb. per cake, the capacity load of ice weighs 16,800 lb., or approximately 8½ tons. The inside of the body sides are free of any obstructions, but the outer sides are stiffened by seven triangular braces extending from the tops of the sides to the rubbing rails on each side at the bottom.

In operation in the summer months and in the rainy or snowy weather, the usual ice body with sides as described above, but entirely open at the top, makes use of a heavy tarpaulin that is rolled out flat on top of the cakes of ice, which extend about three inches above the tops of the sides. This tarpaulin must be tied down with ropes fastened to knots placed along the bottom rubbing rails.

Besides being a nuisance to unroll and roll up again at each loading and unloading, the usual tarpaulin for covering ice would not provide sufficient protection for food products, especially tubs of butter, in the hot summer weather. This led to the mounting of the permanent top, as shown in the accompanying illustration.

The top is supported on four wooden posts on each side and carries three-part curtains on each side and a rear curtain which is rolled up inside the top when not in use. The top is dressed with aluminum paint to reflect the heat of the sun's rays.

THE ensemble of 39-in. steel sides and the permanent top with curtains produces the dual-purpose body which makes it ideal for ice haulage as well as for carrying tub butter; cases of eggs and boxes of poultry. The clear height inside the top is 6 ft., thus allowing sufficient freedom for the driver's loading and unloading operations.

Like many portraits of persons, the accompanying half-tone illustration does not do justice as to the truck's appearance, since it does not show the color combinations of the paints used. The body proper and the sliding-door cab and motor hood are the standard Borden's Produce Division cream; the chassis and wheels are bright red and the striping is blue of the same shade as the Poultryland seal on each side. Lettering is gold leaf, edged in black.

Practical Problems of
TRUCK TRANSPORTATION

DISCUSSED BY EXECUTIVES IN THE FOOD INDUSTRIES

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When does it pay to retread pneumatic truck tires?

Question No. 9

1. What are the determining factors which should be considered in retreading pneumatic truck tires?

2. What effect has the size of the tire upon the economy of retreading?

3. What effect have truck road speeds and percentage of tire overloads upon the determination to retread?

4. What is the relative merit of retreading the tread only as compared with carrying the retreading down both side walls of the tire to the beads?

5. Under what operating conditions are retreaded tires more likely to blow out than new tires?

6. What additional mileage, in percentage of new tire mileage, should a retreaded tire be expected to give under normal road speeds with the tire overloads not in excess of 10 per cent?

7. What method or process have you found to give the most satisfactory results for tire retreading?

300 Retreaded Tires in Use

IN OUR business we have no overloading condition, neither do we have any long distance running or high speed running. These are the three things that would really prove the worth of the retreaded tire. Therefore, as we do not have to contend with these, it is reasonable for us to assume that we would get some worth while results and make a substantial saving on retreading tires.

As far as the application of the tread and the experience and development of the retreading business is concerned we are satisfied that a new tread can be put on a carcass to stay, under the kind of use to which we subject a tire.

We should be able to have this retreading done for not more than 50 per cent of what we pay for a new tire, as I believe that a tire cannot be run its complete life before being removed for retreading. It is reasonable to assume that we sacrifice 10 per cent of the tire's life in doing this, and I am assuming that the retreading will give more than 10 per cent of the mileage of a new tire.

When retreading, the carcass should not be worn below the breaker strip and should be sound in every respect. I do not believe the carcass should be over two years old.

Answering question No. 2, it is almost impossible to get the smaller sizes, in other words, below 600x20, retreaded for 50 per cent of the cost of a new tire. High pressure sizes and larger balloons could be retreaded for below 50 per cent. Therefore, this would indicate that the smaller sizes, and the majority of our tires are of smaller size, are not as economical to retread as the larger ones.

In answer to question No. 3, we have no experience with overloading or overspeeding, as we have no vehicles in that classification.

Referring to question No. 4, we have some tires that are retreaded down the side walls and others that are retreaded to the shoulder. We have no preference and, to date, no reason to believe that one is better than the other. In appearance, the bead to bead has a little advantage.

In giving an answer to question No. 5, I would say that I believe that the retreaded tire is more likely to blow if run under-inflated for a time and then blown up to the correct pressure, as retreading does dry out and over-cure the cords to some extent, making them more likely to break under the extreme flexing set up by under-inflation.

As to question No. 6, we have had several different companies retread tires and find that some do put on a little more tread stock than others. There possibly is a little difference in the quality of tread stock used. These two factors would, no doubt, control the amount of mileage to be gotten from a retreaded job. We have no actual data on the life of retreaded tires, as to date we have about 300 in operation. Most of these are still running, but from what we have already worn out, I would be willing to state that we will get about nine-tenths of the original tire mileage as an average.

Concerning the methods of retreading mentioned in question No. 7, we are more or less in an experimental stage and I am in no position to answer definitely. I do believe, however, that a recapping in our case is best, because it is a little cheaper and hence preferable to retreading from bead to bead.—D. R. BOYER, *Superintendent of Motor Vehicles, Hathaway Bakeries, Inc., Cambridge, Mass.*

100 Per Cent More Miles

I HAVE carefully checked with our garage superintendents and their answers to your questions are summarized as follows:

1. Condition of carcass.
2. Size of tires is no factor.
3. Overload and speed has same effect on retreaded tires as on new tires.
4. We have used both types—as far as service, both are equal. The retreading job from bead to bead makes a better appearance.
5. They will blow out under same conditions as new tires. There is no difference.
6. From 75 to 100 per cent.
7. Retreading methods used by large Akron rubber companies in their local service stores. Factory jobs also have proved most satisfactory.—TED TOD, *Wilson & Co., Inc., Chicago, Ill.*

Runs a Million Miles

OUR experience relative to the retreading of tires is as follows:

1. We have left it to the companies doing our retreading work to determine fitness of carcass and advisability of retreading a particular tire. This answer is based on our conviction thus far that retreading is a saving for us.
2. Have retreaded from 4.50 to 8.25

Next Month's Question

QUESTION No. 10

Do tire records pay?

1. Are individual tire records necessary to assure the lowest cost per tire-mile for truck tires?

2. If not, what other means can be taken to make certain that full value is obtained from truck tires?

3. If individual records are used, what accounting forms are required?

4. Is the cost of maintaining tire records offset by additional mileage secured by adjustment on tires which do not deliver expected mileage?

tire sizes and found it economical thus far.

3. Our trucks are governed to 40 miles per hour and since the inception of the AAA we have not had to worry about truck overloads.

4. Retreading of the tread only has given us the best economy, but this might be, in part, because of tread design and thickness of tread.

5. In two years of operation we have had no blowouts of either new or retreaded tires. This is in about one million miles of operation.

6. Thus far we have averaged 79 per cent of new tire mileage for retreads.

7. We have our retreading done only by companies having complete molds and will not give business to those using more than one application to the tire.—E. E. PETERS, JR., *Peters Packing Co., Inc., McKeesport, Pa.*

Recaps Give Good Service

THE main, or determining, factor which should be considered in retreading pneumatic tires, in our belief, is that the carcass of the tire should be in good condition, having no breaks in the side walls of the tire or of the fabric inside the shoe. This is very vital and unless strictly adhered to the tire will not give satisfactory results.

As to the effect the size of the tire has on the economy of retreading, the percentage of saving when using a retreaded tire compared to a new tire would be the same in so far as percentage is concerned, but, of course, there would be a distinct saving in dollars and cents when coming to the larger-size shoe.

I don't believe there should be any great difference, in so far as truck road speeds are concerned, between a new and a retreaded tire, provided the highways are paved and fairly smooth. However, I do feel, with regard to tire overloads, that it would be a distinct advantage for anyone who is in the habit of using excess overloads in trucking to continue to buy only new shoes, because a certain amount of elasticity or strength in the side walls of a tire is lost from the time the first tread is worn off until the time it is ready to be retreaded. As excess loads have a great bearing on the side walls of the tire, we feel that it would be safer and also more economical in the long run to buy new tires instead of retreading.

As to the relative merit of retreading the tread only compared to retreading the side walls to the bead, our experience here has been only with those tires where the tread has been replaced and not where the whole shoe has been retreaded and built up from the bead.

It is our belief that retreaded tires are more likely to blow out than new tires where there are heavy or excessive overloads on long runs over highways that are not well paved.

We have estimated that the additional mileage we are able to get out of a retreaded tire in percentage of new tire mileage is between 70 and 80 per cent, so that when you consider the cost of retreaded as about 35 per cent of the cost of a new tire, you can readily see the saving.

Close-up of a retreaded truck tire which had delivered 4,000 miles of service at the time of photographing. The new tread cost about half the price of a new tire of the same size. The tire pictured is mounted on the front wheel of a 5-ton truck owned by Vogt's Ice Cream, Inc., and is used to haul milk in New York City.

The method or process which we believe to be the most satisfactory for use in the retreading of tires is the one where the live rubber (tread) is heated and placed on the top of the tire without heating the side walls of the tire. Our reason for believing this is that we feel that heating the side walls of the tire removes a certain amount of elasticity or strength from that particular tire and, therefore, subjects it to blowouts more readily.—R. S. VOGT, *Vogt's Ice Cream, Inc., New York, N. Y.*

Saves Half New Tire Cost

OUR experience with retreaded tires may be summarized by the following answers to your seven questions:

1. The carcass should be in good condition, as it is never advisable to retread a cracked or weakened carcass.

2. The saving by retreading tires is about one-half the cost of new tires. Therefore, the larger the tire the greater the saving.

3. High speeds do not seem to have any ill effect.

4. We do not think it necessary to retread side walls, because if the side walls are weakened, it is never advisable to rebuild the tire.

5. Retreaded tires are not likely to blow out any more than a new tire if the carcass is good and is not more than two years old.

6. Retreaded tires should normally give about 66⅔ per cent of new tire mileage.

7. The clam shell mould process in a full circle is the best method of retreading known at the present time.—GEORGE A. SCHMIDT, JR., *Stahl-Meyer, Inc., New York, N. Y.*

Prefers Tire Regrooving

ROAD speeds and overloads are two very important factors in using retreaded tires. Speaking from experience, we have found that retreaded tires used on trucks requiring high speed have been very unsatisfactory, because the carcass seems to break and the tire forms blisters on the side walls of the casing. If used on the front wheels it has a tendency to cause them to shimmy. Because of irregularities of the side walls after retreading it is rather difficult, without a special instrument, to determine the wheel alignment of trucks equipped with tires of this kind.

We have never had any experience with retreading the tread only. Those we have used carried both side walls of the tire to the beads. We find it rather troublesome to maintain these retreaded tires on rims because of the extra thickness of rubber in the beads and in some instances rims have been considerably mutilated trying to drive them into position for locking.

On hard, steady runs where a considerable amount of heat is built-up, retreaded tires are more likely to blow out than new ones.

About one-third of the new tire mileage is about all one can expect to get from retreaded tires under normal road speeds with trucks not overloaded.

The only type of retreaded tire we have used are those with the side walls that extend to the rim or beads.

We use a systematic check each week for pressures and wheel alignment, because a delay to one of our trucks loaded with perishable products is very aggravating to our trade, which insists upon deliveries on scheduled time. Consequently, we systematically inspect all our tire equipment once each week.

We have had, in some instances, retreaded tires that developed blisters on the side walls after the tire had gone 5,000 to 6,000 miles. In other cases, we have had them go 20,000 miles and be about worn out, without experiencing any difficulty. The whole thing depends upon the condition of the carcass that is retreaded.

Summing up, we have not found retreaded tires altogether satisfactory, when compared with the satisfaction derived from new tires. Considering the degree of uncertainty as to performance of retreaded tires we have found it just as satisfactory to regroove our tires and run them until they are worn to the breaker strip and then replace them.—H. E. WENNAGEL, *Traffic Manager, the Wm. Schluderberg-T. J. Kurdle Co., Baltimore, Md.*

IDEAS
from Practical Men

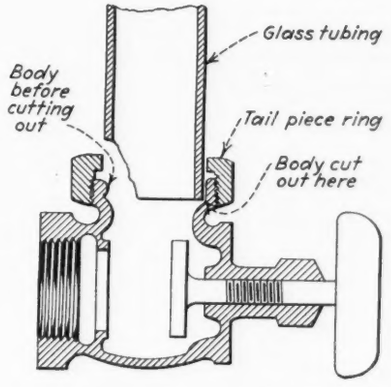
Large Gage Glass

FOR viscous liquids or where easy cleaning is essential, large diameter gage glasses are a necessity. An inexpensive method of installing such glasses is described here.

A radiator valve is substituted for the more expensive gage glass fitting by inserting the glass in place of the tail piece, as shown in the accompanying sketch. With some valves it may be found necessary to ream out the body of the valve in order to allow the glass to go into the valve a little farther.

A gasket can be used and tightened down by means of the tail piece ring. Where the pressures are nominal, ordinary Pyrex tubing, ordered in specified diameters from any laboratory supply house, can be used in place of the more expensive gage glass.

This method was first used because regular glasses and fittings of required diameter could not be secured upon short notice. Since then it has been found satisfactory for experimental as well as permanent installations.—W. L. SCOVILL, *Lansing, Mich.*



A gage glass fitting made from a radiator valve.

Power Turntables

FEW realize what a handy device is the power-driven turntable. Recently one solved a problem in connection with feeding containers to a packaging line. In this case, one girl could not take the containers out of the cases and feed them rapidly enough, so she was obliged to place them on a small table from which they were taken by another operator and placed in the machine runway. By arranging the guides on the turntable in a sort of eccentric curve, the containers were made to line up regardless of how they were placed on the table and to shoot right into the runway.

Again, on the discharge of a machine where there was a time lag caused by the presence of a slide plate, the turntable solved a synchronizing problem by removing the containers from a moving belt and carrying them around a 180 deg. curve onto the moving belt of another machine. Turntables have often been used, of course, when it is desired to transfer packages from a belt going in one direction to another traveling at right angles to it. But their value in eliminating slide plates and making possible a more uniform movement has not been fully utilized. The slide plate often causes trouble and could easily be eliminated in the construction of standard equipment if the packaging machine people would get together and provide all exit conveyors with turntables. Intakes would not ordinarily be required, excepting possibly on filling machines, because the intake of one machine would be slid under the turntable exit of another. It is not essential that these be large—a 12 or 18 in. table would be large enough for the great majority of packages. — FRANCIS CHILSON, *New York, N. Y.*

★ ★ ★ ★ ★

$5 for Puzzle Solvers

NOTHING racks the plant man's brains more than the knotty little problems that come up in the day-by-day routine of plant operation. You have undoubtedly solved some of these problems in your plant, so come to the aid of those who are still puzzling by telling them how you did it. A sketch or photograph will help to make your story clear. We will pay $5 for each item of this nature published.

Cuts Fuel Costs 74.4 Per Cent

MONTHLY fuel costs for process steam have been cut $93 in the plant of Vogt's Ice Cream, Inc., New York, N. Y. Steam capacity has been increased by 50 per cent at the same time. This was done by investing $1,400 in a 15-hp., oil-fired steam boiler to replace a 10-hp., gas-fired boiler formerly used. To operate the gas boiler cost $125 a month for fuel; the investment represented by the boiler was $800. To operate the oil-fired unit costs only $32 a month for fuel, the price of the oil being 6 cents a gallon.

The oil-fired boiler operates at a pressure of 70 to 80 lb., is automatically controlled and is compact. It is of the internal-combustion, four-pass, down-draft construction having the cool tubes at the bottom to eliminate danger of burning due to a collection of sediment.

The company made the change in boilers two years ago. The gas-fired unit was only three years old then and it was in good condition, so it was kept as an auxiliary. Used for that purpose, it never runs a fuel bill of more than $2 a month, with the rate for gas at the figure charged to household consumers.

It's Done With Mirrors

WHEN there is some part of a process that must be watched but which is in a difficult position to see, a mirror sometimes can be used to good advantage. An example may be seen in the packaging plant of Pioneer Ice Cream Brands, Inc., New York, N. Y. In that plant is a large machine for filling pint and quart packages, having a big hopper which receives ice cream from freezers on the floor above. The operator must watch the level of the ice cream in the hopper, and to do this by direct observation he would have to scale a stepladder. This, of course, would take time and effort and involve the risk of falling; but with the aid of a mirror mounted on the ceiling above the hopper he can watch the level without moving out of his tracks. The mirror is about 2 ft. square.

BUSINESS TRENDS

Butter Bucks Trend

STIMULATED by short supplies, butter prices swam upstream against the seasonal trend during most of April. Ground lost during March was recovered and by the middle of the month, prices were again at a peak. Thereafter, decline again set in and prices leveled off to near the March lows, still remaining considerably about the normal seasonal level. In consequence, imports of New Zealand, Australian and other butters continued at a relatively high level. As late as April 20, one vessel unloaded at New York 22,250 boxes of Antipodean butter and 1,034 casks from Europe, while another steamer from Rotterdam brought 2,700 casks from Holland.

Underlying this market is the continued low supply in storage, which at 5,338,000 lb. on April 1, was only one-third of normal. A continuing factor that may neutralize the effect of low supply upon butter price, is the increase in margarine consumption, still running at levels more than 100 per cent above the same period of 1934.

Increased Plantings Planned

REPORTS received by the Bureau of Agricultural Economics from 46,000 farmers located in all parts of the country forecast a moderate increase in the acreage planted to principal crops. Potatoes, sweet potatoes, oats, barley and rye will be planted to about the usual figure. Grain sorghums and soybeans will show some increase. Most of the other field crops are likely to be somewhat below the usual average. Corn acreage, forecast as about 5 per cent below the average, will be the same as that planted last year, but will be almost 10 per cent more than was harvested in 1934. The acreage planted to feed crops will be large, as the necessity exists for rebuilding the reserve depleted during drought years.

Among the smaller crops, increases are planned for dry edible beans, onions, and cabbage. Increases are also expected in many of the major canning crops, as well as in truck crops for the fresh vegetable market.

Canning Acreages Increased

INTENDED acreages for important canning crops show considerable increase over the areas planted in 1934. Canners of snap beans, as reported to the U.S. Department of Agriculture late in March, propose to increase their acreage by 7 per cent, from 47,240 acres to 50,480. Sweet corn for canning will be up 13 per cent in acreage, from 322,970 to 365,430. Intended acreage for canning peas, at 319,360, compared to 281,140 in 1934, is the largest on record.

Weather Damage Clouds Outlook

APRIL freezes in the Midwestern crop region may cause the 1935 crop outlook to vary considerably from the rather rosy picture being painted in some quarters. The middle of the month saw temperatures as low as 20 deg. F. in the Central States, and budding trees and some growing vegetables are said to have been pretty hard hit, although estimates of the damage are not yet available. Peaches in Indiana and Michigan spring fruits, in particular, have suffered.

While frost has not visited the Pacific Coast, California reports much weather damage. Heavy rains are said to have affected adversely the new apricot crop by at least 20 per cent. Cool weather in the Sacramento valley and other parts of the state has wrecked havoc on the spinach crop and the pack of canned spinach is said to be affected.

Prospects for the winter wheat crop, in the face of the drought, have been revised downward again. In addition, the continued dry weather in many sections is beginning to cause some doubts as to the yield of spring wheat.

Considering the agricultural outlook from a countrywide viewpoint, it seems certain that, unless a general improvement to more favorable growing weather is experienced, 1935 will not be even an average crop year.

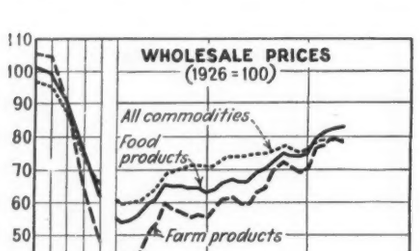
World Wheat Off

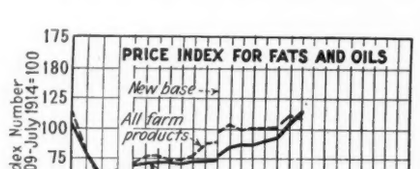
WHILE the short wheat crop forecast for the United States in 1935 will not leave much for export, whatever is shipped is likely to meet a more favorable market than has been the case for some years past. According to a recent report of the Bureau of Agricultural Economics, the surplus of wheat available for export or carry-over in the principal exporting countries, in March, was only 664 million bushels. This compares with 919 million bushels a year ago and 1 billion bushels two years ago.

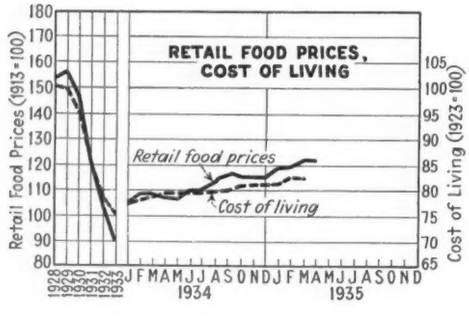
More Frozen Vegetables

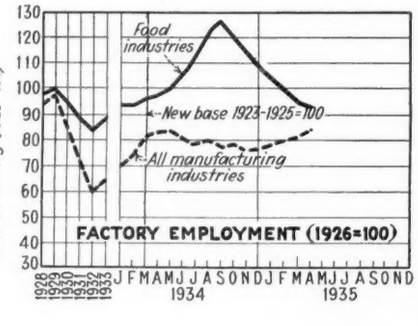
COMMERCIAL production of bulk-packed frozen vegetables is under way on an increasing scale in the Northwest.

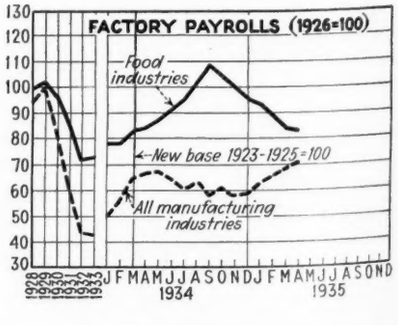
Exclusive of the packaged peas frozen by Frosted Foods Sales Corp. (General Foods subsidiary) 300 tons of frozen











Prices on Upward Climb

PASSAGE of the 4.8 billion dollar work relief act is too recent to have had any measurable effect upon general business activity, which on April 1 started its second downward course for 1935. This, despite continued production activity in the automobile industry, stronger prices in speculative and commodity markets, averting of threatened domestic strikes, and passing of the immediate war scare in Europe.

The *Business Week* index shows business activity at 62.7 per cent of normal for the week ending April 20; a 2 per cent decline for the three week period, practically no change for the month.

Drought conditions continue in grain growing regions and raw sugar supplies are being restricted by sugar exporting countries. Both factors make for higher prices in cereal products and refined sugar.

U.S. Department of Labor report wholesale prices for all commodities 1.13, farm products 3.28, and foods 3.27 per cent higher for the five weeks ending April 20.

New York *Journal of Commerce* weighted price index jumps these advances 3.37 per cent for general index, 8.84 per cent for grain, and 6.34 per cent for food for the month ending April 29.

shelled peas and a few carloads of frozen corn were packed in 1934. Tonnage is expected to rise markedly in 1935 and from then on, as plans for 1935 are already being laid and new companies are being formed. However, it is too early to predict just who will be the 1935 packers or what their tonnage will be.

Thus far the largest packer of frozen vegetables has been Frosted Foods Sales Corp., whose 1934 tonnage was considerably above that packed by such organizations as the Hershey Packing Corp., Snohomish; National Fruit Packing Co., Chehalis; M. Nakata & Co., Seattle; or the now dissolved Hershey Foods, Inc., Seattle.

Small Receipts Boost Meats

CHOICE steers at $15.50 per hundredweight in Chicago in mid-April were at the highest level since March, 1930. Coincidentally, the spread was the highest on record. One feeder reported receiving $14.25 for cattle that cost him $4.65, while another received the same price for cattle that cost about $4.00.

This situation sprung from the lowest April receipts on record, with cattle running only 97,800 head at Chicago during the first 19 days of the month compared to 116,736 head a year ago. Hogs received in the same period were 185,000 head, compared to 302,000 head last year, while sheep ran ahead, with 226,000 compared to 150,000. Hog prices, while below the tops of last month, were still high at $9.25; and sheep and lambs, at $8.40, also continued high.

In spite of these high yard-prices, wholesale prices remained fairly steady. Consumer resistance was sufficiently effective to restrict the month's rise to 1½c. per lb. for beef, while lamb was unchanged, and fresh pork loins were off 2½c.

Sugar Consumption Up

REPORTS for the year, so far, show sugar consumption in the U.S. slightly higher this year as compared to the same period last year, according to the Sugar Institute. During the same period, Lamborn & Co. statistics show the fourteen principal consuming countries of Europe increased their sugar intake by approximately 3 per cent.

While this European result is a continuation of a trend already apparent, the increase in the United States marks a reversal from 1934, which showed a total consumption off 1.9 per cent from 1933 in the face of an average price that was 12 per cent higher. U.S. sugar exports are also showing an increase, being 156 per cent higher in January and February of this year than in the same months of 1934.

Construction News

	Pending (thousands)	Awarded April (thousands)	Total Awarded 1935 (thousands)
Bakery	$30	$78	$135
Beverages	169	578	2,268
Canning and Preserving	229	245	559
Confectionery	...	...	...
Grain Mill Products	168	150	278
Ice, Manufactured	28	30	206
Meats and Meat Products	78	21	300
Milk Products	458	268	632
Miscellaneous	396	181	942
Total	$1,556	$1,551	$5,320

INDICATORS

MILK production of 11.77 lb. per cow in March is the lowest on record for that date, according to the Bureau of Agricultural Economics.

EDIBLE fats and oils, particularly lard, butter and cottonseed oil are scarce and prices will rise, forcing substitution in Europe and Asia of other oils commonly used for soap. Abundant flaxseed supplies will prevent the shortage from becoming acute.

RESTRICTED egg supplies are causing bootlegging among suppliers, according to Professor Botsford of Cornell University, who finds low grade eggs going to market disguised as firsts.

COFFEE exports from Brazil, from July 1, 1934, to the end of March, were off 3,210,000 bags, or 24.5 per cent compared to the previous year.

COFFEE supply, excluding Brazil's restricted stocks, increased 438,611 bags, or 6.8 per cent, in March, according to the New York Coffee and Sugar Exchange.

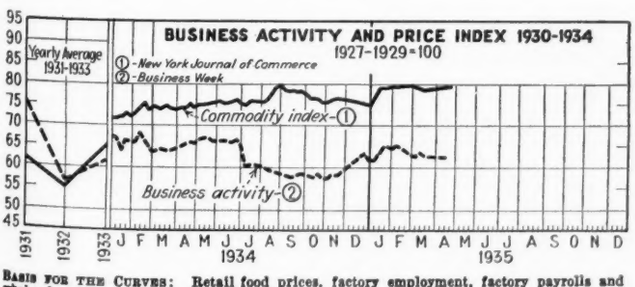
COFFEE deliveries in the world market, for the nine months preceding April 1, decreased 11.3 per cent, to 16,791,124 bags, as reported by the New York Coffee and Sugar Exchange.

FROZEN egg canning has increased rapidly during the past five years and now exceeds 150,000,000 lb. annually.

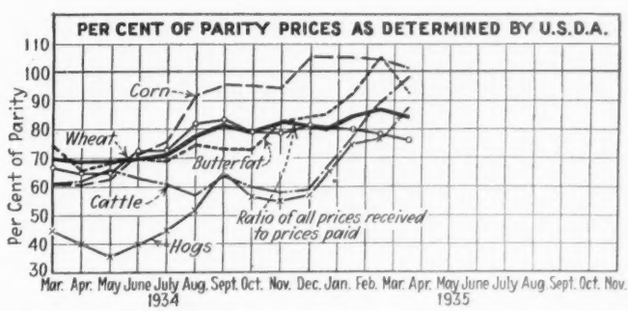
FOOD prices, according to the Dun & Bradstreet index, advanced in April, but are still below the February figure of $2.76, although almost 30 per cent above 1934.

ALUMINUM cans to a total of 10,000,000 were used by Norwegian fish canners in 1934, against 2,000,000 used in the preceding year.

CARLOADINGS are at the highest level for the period since 1931, according to the American Association of Railroads, showing an advance of 1.3 per cent above 1934 for the week of April 13.



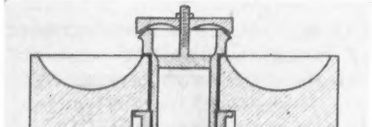
BASIS FOR THE CURVES: Retail food prices, factory employment, factory payrolls and wholesale prices based on indexes of the Department of Labor. Cost of living index is that of the National Industrial Conference Board. Indexes of prices of fats and oils, and of all farm prices are from the U. S. Department of Agriculture, as are the per cent of parity prices.


PER CENT OF PARITY PRICES AS DETERMINED BY U.S.D.A.
Per Cent of Parity
Corn
Wheat
Butterfat
Cattle
Hogs
Ratio of all prices received to prices paid
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov.
1934
1935

NEW EQUIPMENT

for Food Manufacturers

Section through leak-proof tube.



Cross-section of radiant gas burner.

Leak-Proof Tube

A NEW tube for pneumatic tires, developed by Firestone Tire & Rubber Co., Akron, Ohio, is said to be pinch-proof and leak-proof, and to have 25 per cent longer life than other tubes. The pinch-proof quality is because of the material used, a black stock similar to tread stock, and because it is formed with an extra thick base. This also increases resistance to cutting and wear.

Two features make the tube leak-proof. One is the specially compounded lining, which seals against air loss. The other is an all-rubber valve steam vulcanized into the tube. The tube, known as the "Sealtyte", gives longer life because it eliminates under-inflation.

Gas Burners

RADIANT gas heat for industrial heating equipment is available by means of a burner produced by Burdett Manufacturing Co., 19 North Sheldon St., Chicago, Ill. This burner is of the surface combustion type. Referring to the accompanying cross-section, it will be seen that the fuel and air mixture enters at the center of the circular burner. The baffle projects it downward and over the curved surface of the annular indentation in the refractory disk. Just as the flame leaves the baffle, it ignites. In a brief period, the flame passing over the refractory surface raises its temperature to a point where it becomes radiant and complete combustion of the fuel thereafter occurs before the gas-air mixture has passed beyond the refractory.

Burners of this type are economical and flexible. They are used in such operations as peanut and coffee roasting, candy cooking, and bread baking.

Centrifugal Compressors

A COMPACT centrifugal compressor or turbo-blower, powered by a geared-motor, has been brought out by Allis Chalmers Mfg. Co., Milwaukee, Wis. Motor, gears, and blower are mounted on a single baseplate. By using the geared motor for speed increase, the blower can be run at higher than motor speeds, thus reducing dimensions. Motor sizes from 3 to 30 hp. are used, with corresponding volumetric capacities. This equipment is suitable for oil and gas furnaces, pneumatic conveying, agitation, aeration and similar purposes.

Gas Tractor

MERCURY MANUFACTURING Co., 4118 South Halsted Street, Chicago, Ill., announces Type "D" gas tractor equipped with large-size pneumatic tires, front and rear. Dual rear tires provide increased traction and a cushioning effect which is valuable when operating over rough roadways, in yards, up grades, and in similar operations.

This tractor, with pneumatic tires, provides an industrial hauling unit of compact overall dimensions and short turning radius. Overall length is 86 in., width 60 in., and outside turning radius 115 in. The shock-absorbing effect of dual pneumatic rear tires and large front tires provides cushioning for the tractor mechanism and easy riding performance.

Gas-driven industrial tractor.

Pump for Water Treatment

A PUMP developed especially for delivering exact quantities of water-treating chemicals into water supplies, at predetermined intervals, has been developed by Dearborn Chemical Co., 310 South Michigan Ave., Chicago, Ill. The pump is also adaptable for use with any

type of liquid or semi-liquid chemicals and for close proportioning of coagulants. This pump is of the plunger type. It can be operated by water power, electric motor, ratchet or reciprocating device, chain, or belt drive.

Dodge Trucks

A VARIETY of wheelbases in several types of trucks characterize the 1935 standard line of the Dodge Bros. Corp., Detroit, Mich. In addition, this concern also produces many special-purpose trucks.

In commercial delivery vehicles, Dodge has trucks of 111¼ in. and 119 in. wheelbases, with express, sedan, canopy, screen and panel bodies.

The 1½-ton standard line has four wheelbases. In the 131 in. wheelbase, are cabs, express, canopy, screen and panel bodies. The 136 in. and 161 in. series present cabs, platform and stake bodies. The 148 in. wheelbase is limited to chassis, or chassis and cab.

The 2-ton models are on wheelbases of 140 in., 157 in., 169 in., and 190 in. Heavy duty models up to 9 ton payload are also provided.

Magnetic Starter

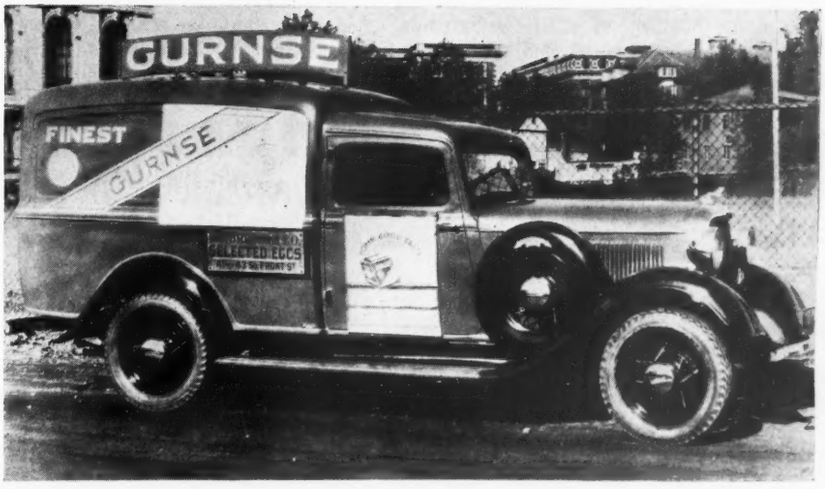
A NEW line of oil-immersed magnetic starters of the reduced-voltage, autotransformer type, in which all arcing contacts are 6 in. under oil, has been developed by the General Electric Co., Schenectady, N. Y. An induction-type temperature overload relay is used, also mounted in the oil. Either current-limit or time-limit acceleration is available and an ammeter attachment can be supplied if desired. Ratings range upward to 600 amperes at 600 volts and 200 amperes at 2,500 volts.

Universal Meter

TEMPERATURE, pressure and flow of any fluid can be recorded by means of a new meter introduced by Foxboro Co., Foxboro, Mass. Pen interference in recording these three quantities on one chart is avoided by having the pens all move about the same center of rotation.

A mechanical integrator is provided which shows the total flow on an easily-read counter, no multipliers being necessary since the counter reads directly in terms of total flow. A recording pen can be added which makes a mark on the chart rim when the integrator adds a given amount to its count. A pressure compensator can also be added whenever widely-varying static pressures make it otherwise impossible to get accurate measurement. This compensator automatically corrects both the record and the integrator reading for all variations in static pressure as soon as they occur.

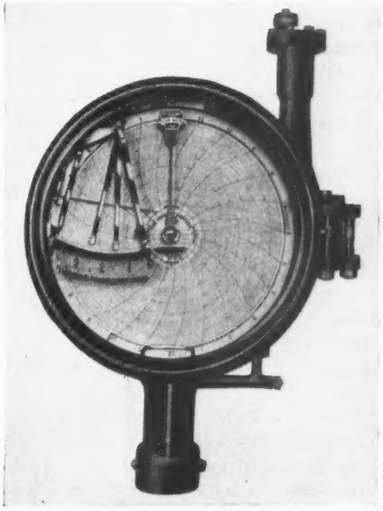
The meter is protected from over-



Dodge truck for food delivery.

range flows or incorrect manifold valve manipulation by standard Foxboro check valves of float type. It is claimed that these valves are positive in operation and full line pressure may be applied to either mercury chamber with the other side open to atmosphere without any mercury being blown out; also that the line fluid will not bubble through the mercury and result in emulsification.

Another feature provided is a transparent indicating scale from which flow can be read direct. These meters are for measuring steam, oil, air, water, gas, acids or any other industrial fluids.



Universal meter.

Pressure Regulators

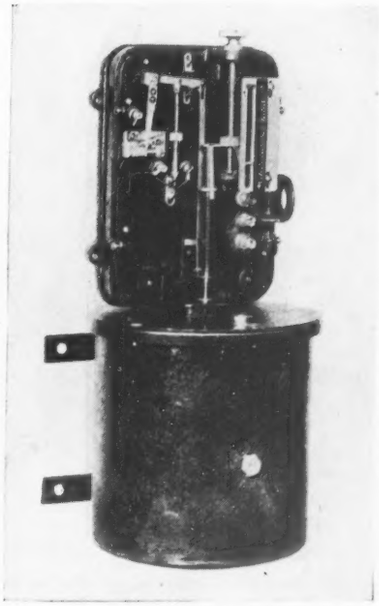
FOR installations requiring accurate control of low pressures, not normally more than 1 in. of water above or below atmosphere, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., has brought out a new static pressure regulator.

This regulator finds its widest application in maintaining static head in air distribution systems, and contributes to the flexibility of the "Modutrol" system of temperature and air conditioning control. It employs an inverted bell with liquid seal as a contact actuating means. A push rod extends from the bell up through the housing and transmits the movement of the bell, through levers, to the control contacts.

This device is useful for controlling positive or static pressure, draft, or as a differential controller; depending upon how the pressure connections are made. It can be changed quickly from one to another of these types of control.

Position Transmitter

A DUPLICATE position telemeter system for indicating and recording at a distance the position of mechanisms, has been developed by Westinghouse Electric & Manufacturing Co., East



Static pressure control, cover removed.

Pittsburgh, Pa. This device will indicate the position of such mechanisms as valves, or governors, and will show liquid level. It is assembled in a rectangular case for switchboard mounting. In it, a duplicate position type of motor operates a direct-acting pen recording on a strip-type chart. The device is known as the Type "GH" position recorder.

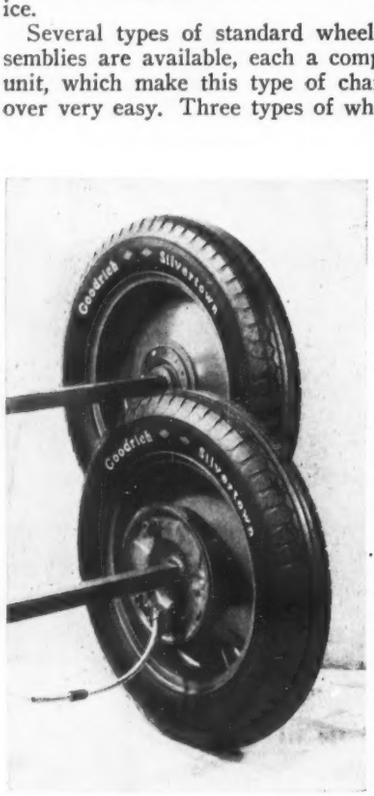
Pneumatic Wagon Tires

THE B. F. GOODRICH Co., Akron, Ohio, announces a new product which they have named "Silvertown Wagon Wheel." It is a pneumatic tire specially designed for wagon wheel service, on retail delivery wagons. This complete assembly of tires, wheels, axles and brakes makes it an easy matter to change over from present equipment.

Tread and sidewall of the new "Silvertown Wagon Wheel" tire are designed to give maximum resistance to wear over a long period of time, and to resist deterioration caused by long exposure under all kinds of weather conditions. Ordinary tires used in this type of service will rot out, rather than wear out.

Sidewalls are made extremely tough, to resist curb chafing. Tread design is shallow, because on gravel roads at slow speeds a deep tread design tends to pick up and hold small stones much more than does the new tire. Tires are of nominal cross-section with adequate capacity rating for retail delivery service.

Several types of standard wheel assemblies are available, each a complete unit, which make this type of change-over very easy. Three types of wheels, steel disk, wire, or malleable iron modified disk, may be selected. Several of the assemblies are complete with tires, wheels, hubs with Timken bearings, hub caps and necessary studs and bolts for applying and mounting wheels, Bendix two-shoe brakes, complete with cables, and square steel alloy axles machined for Timken bearings. Advantages claimed by the manufacturer for this assembly are lower draw-bar pull to start and move wagon, fewer horses for a given load, lower maintenance costs, reduced weight, and greater safety.



"Silvertown" wagon wheel for horse-drawn delivery wagons, with brake shown on lower wheel.

Plastic Material

A NEW plastic material, said to be superior to rubber for the manufacture of a wide variety of products, has been developed by B. F. Goodrich Co., Akron, Ohio. It may be molded into any shape, and possesses greater flexing life than rubber. Known as "Koroseal," the new product is not expected to replace rubber in general use, but has application for uses where a rubbery consistency, combined with superior resistance to certain oils or chemicals, is required.

The Manufacturers Offer . . .

Speed Reducers — Speed reducers, with motor attached to form a unit, called "Motorized Reducers," are described and specified by Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill., in catalog No. 1515.

Milk Irradiator — A thin-film irradiator, called "Double Bubble," for imparting vitamin D content to milk, is described by Cherry-Burrell Corp., 427 W. Randolph St., Chicago, Ill., in bulletin G-247.

Tire Handbook—Data for truck operators as to the selection and operation of tires are included by B. F. Goodrich Co., Akron, Ohio, in the 1935 edition of their Operators Handbook for trucks, buses and tractors.

Colloid Mills—Chemicolloid Laboratories, Inc., 44 Whitehall St., New York, N. Y., discusses the construction and application of the Charlotte colloid mill in a recently issued catalog.

Bakery Equipment—Equipment for frying doughnuts, making noodles, ventilating plants, sealing wrappers, and for electric baking are treated in several new bulletins issued by Bakers Supply and Equipment Co., St. Paul, Minn.

Lift Truck — Improvements in the Lyon hydraulic lift truck are announced by Lyon Iron Works, Greene, New York, in bulletin No. 108.

Sanitary Pumps—For use with milk products, canning materials, beer and other beverages, syrups, and similar materials, Waukesha Foundry Co., Waukesha, Wis., in bulletin No. 505, describes the construction and operation of its line of sanitary pumps.

Steel Tubes—A 1935 warehouse stock list of steel and boiler tubes has been published by A. B. Murray Co., Inc., 147 Wolcott St., Brooklyn, N. Y.

Magnetic Separators—High duty magnetic pulleys and magnetic pulley separators of the "Stearns" type, are discussed by Magnetic Manufacturing Co., Milwaukee, Wis., in a new bulletin, No. 300.

Glass-lined Equipment—For canners, preservers, and manufacturers of flavors, beverages, mayonnaise and similar products, the Pfaudler Co., Rochester, N. Y., discusses its line of glass-lined processing equipment in catalog No. 759.

Air Filter — As a means of providing sterile air for laboratories, Davies Air Filter Co., 390 Fourth Ave., New York, N. Y., describes the "Filteraire" equipment in a new bulletin.

Stainless Steel — For use in fabricating equipment, stainless steel in sheet form is discussed by American Rolling Mill Co., Middletown, Ohio, in a new bulletin.

Conveyors — Designed for the continuous flow of granular or pulverized material, Redler conveyors are the subject of a catalog issued by Stephens-Adamson Manufacturing Co., Aurora, Ill.

Sodium Sesquisilicate — A new "Metso" detergent, sodium sesquisilicate, of high alkalinity, for equipment cleaning, is described by Philadelphia Quartz Co., Philadelphia, Pa., in a recently issued bulletin.

Corrosion-Resistant Steel—"Enduro" 18-8 stainless steels are the subject of a new illustrated bulletin, No. 125-A, issued by Republic Steel Corp., Massillon, Ohio, and giving the latest authentic data on this material.

Baking Ovens — Baker Perkins Co., Inc., Saginaw, Mich., describes the installation of its "Diathermatic" ovens in the bakery of Gartman Baking Co., Latrobe, Pa., in a new folder.

Mixing Equipment — "Gardner" and "Unique" mixers, for the food industries, are the subject of bulletin 32-D, a new 56-page catalog issued by Robinson Manufacturing Co., Muncy, Pa.

Stokers—Type E, center retort, underfeed stokers, made by Combustion Engineering Co., Inc., 200 Madison Ave., New York, N. Y., are the subject of a 16-page catalog, No. E-8.

Industrial Equipment — A 52-page illustrated catalog, issued by L. O. Koven & Brother, Inc., 126 Ogden Ave., Jersey City, N. J., outlines the service offered by this company to industry in fabricating all sorts of equipment from sheet metal and plate.

Leather Packing—All sorts of leather packing, for pumps, presses, compressors, and other equipment, is described by Alexander Brothers, Inc., 406 North Third St., Philadelphia, Pa., in a 24-page general catalog.

Circuit Breakers—"Trip-Free" air circuit breakers for buildings, industrial plants and power stations are described by General Electric Co., Schenectady, N. Y., in bulletin GEA-1662A.

Keeping Up With the Field

- *Chances of food and drug bill dimmed by Senators*
- *AAA amendments lose ground as opposition grows*
- *Several changes made in codes for food industries*
- *Poultry case challenges constitutionality of NIRA*
- *Tri-State canners and dry milk manufacturers meet*

Copeland Bill Shelved

ALTHOUGH indorsed by food manufacturers, favored by the President and hailed by consumers, the Copeland bill has hit a Senatorial snarl. Thought a few weeks ago to be headed for early enactment, the bill was upset on April 8 when Senator Clark of Missouri and Senator Bailey of North Carolina succeeded in having two emasculating amendments adopted. One of the amendments would have redefined the conditions under which false advertising amounted to adulteration, pulling the teeth out of that part of the measure. The other specifically forbade multiple seizures of suspected goods.

At that stage of the developments there was some effort to recommit the bill for further rewriting. To avoid its assassination by that move, Senator Copeland had the bill put back on the Senate calendar. This means that it can be brought up again this session, or it may lie dormant to become unfinished business of the Senate.

Neither its sponsor nor consumer representatives will back the bill with the Bailey amendments, they contending that it is weaker than the present law. While the situation is somewhat uncertain, it would seem that there is small chance of new food and drug legislation being enacted by this Congress.

SENATOR COPELAND

"As far as I am concerned, it is dead for this session," was the terse statement with which the food and drug bill sponsor expressed his sentiments in regard to the bill's "emasculation" in the Senate. But some say the Senator may be kidding.

AAA Loses Strength

OPPOSITION to the AAA amendments has become quite strong of late. A good fight is developing in Congress on this legislation, which, if it does not kill the amendments, will at least cause substantial changes to be made in them.

About a month ago, the House agricultural committee reported the measures in a rewritten form embracing most of the farm relief proposals of the last decade. But unexpected opposition developed and sent them back for further revision. In the Senate, the agricultural committee favored the amendments, but Senator Smith, chairman, held back the report. On April 24, however, both the House and Senate committees reported the legislation, the former inserting a limitation preventing issuance of licenses to retailers.

For a time, the opposition was without a leader, but late last month Senator Byrd took the reins and unleashed an attack over the radio. The food industry officially threw its weight against the AAA, too, Associated Grocery Manufacturers of America reporting uncompromising opposition on the part of the processors.

Changes in Codes

CODE ACTIVITIES in the food field in April were concerned with the revamping of existing codes to make them conform better to conditions in the trade.

An amendment to the code for the pasteurized-blended process cheese industry, approved by NIRB on April 9, provides for liquidated damages for violation of the various articles of the code. A change in the coffee code, effective May 1, requires the code authority to submit within three months standards for safety and health of employees during working hours. A revision in the baking code establishes a new group of bake shops, to be known as semi-handcraft shops, and provides for a maximum work-week of 44 hours. Mechanized shops are limited to 40 hours and handcraft shops are permitted to work 48 hours. Semi-handcraft shops are defined as those in which at least 80 per cent of the total working hours of all production employees is spent in hand operations.

Recent rulings by NRA give special treatment to two food concerns. One

places the Beech-Nut Packing Co., Canajoharie, N. Y., under the labor provisions for the chewing-gum industry, with certain modifications favorable to the employees. The second exempts the Wilbur-Suchard Chocolate Co., Lititz, Pa., from the wage provisions for the cocoa and chocolate manufacturing industry, this exemption lasting until June 16. However, the company must comply with the wage provisions of the candy code and make restitution of back wages to its employees on the basis of the cocoa and chocolate code. This exemption was granted because of the large amount of labor used in the plant in comparison to its more highly mechanized competitors.

Alterations in other food codes have been proposed, and action is being taken on them. The brewing industry wants to amend its code to prohibit cooperative advertising with retailers, to outlaw the giving of accessories to retailers and to prevent other tactics tending to bind the retailer to one brewer. A questionnaire sent out following a hearing on these changes shows a ratio of better than three to one in favor of the amendments.

The code authority for the canning industry has asked that optional flat piece rates for tomato peeling be established. The proposed rates are 8c. per 16 qt. basket in the North, 6½c. in the South and 7c. in the intermediate district. If these rates be made effective, tomato peelers must not be required to do any other work while on the piece-rate basis.

Standards of ingredients, product, nomenclature, terminology and packaging will be worked out for the pretzel industry if a proposed amendment goes through. The membership of the code authority for the candy industry would be changed to include seven members of the industry doing an annual business of over $200,000 and two doing a business less than that amount by prosposed amendments. At present, seven of the members must be members of National Confectioners Association. Proposed amendments to the mayonnaise code would redefine the industry, regulate the resale of industry products by trade buyers other than retailers, require complete records of all transactions in the industry and provide for a liquidated damages agreement.

Hen Challenges Eagle

A CASE in the food field which will afford further opportunity to make clear the nature and extent of the government power to regulate interstate commerce has been taken before the Supreme Court. This is the case of the United States vs. A. L. A. Schechter Poultry Corp., New York, and it involves the constitutionality of the Recovery Act. The Circuit Court of Appeals upheld the Government in its charges of violation of the New York poultry code, particularly with respect to the sale of poultry, including diseased and uninspected poultry. Violations of the wage and hour provisions of the code also were charged, but the circuit court did not uphold these.

MRS. PINCHOT LEADS PICKETERS

National Biscuit Co. employees, 2,500 strong, were led in their picketing activities last month by the wife of the former governor of Pennsylvania. The employees, on strike since Jan. 8, charged the company with violating its agreement to equalize wages. NBC reached an agreement April 29 with Inside Bakery Workers Federal Union, pre-strike wages prevailing and the union gaining recognition. Plants in New York, Philadelphia, Atlanta and York, Pa., are affected.

Canners Meet

MANY problems of the canning industry were discussed at the spring meeting of Tri-State Packers' Association, April 11-12, at Baltimore. Discussing the canning code, representatives of the state compliance directors for Delaware, Maryland and New Jersey all reported splendid cooperation from the canners and said that only in a limited number of cases were wage and hour provisions not strictly followed. Ralph O. Dulany, chairman of the canning code authority, indicated that a flat piece rate for peeling tomatoes may be promulgated for the 1935 season. He felt, however, that lack of sufficient data on other types of piecework makes it very unlikely that other flat rates will be established. The code authority has requested a rate of 8c. per 16-qt. bucket in the Northern district, 7c. in the intermediate district and 6½c. in the Southern district. Weld M. Stevens, Deputy Administrator, stated that enforcement of the code from now on will be more vigorous and with less delay.

Dr. C. B. Sayre, of the Geneva Experiment Station of New York, reported that studies reveal that the most economic use of fertilizer for crops planted in rows was application by strips near the row at either or both sides. A report on work done by the University of Maryland on poison sprays indicated that there is a good chance of killing moths with poison bait traps.

Commenting on the new standards for soaked dry peas, Maurice E. Siegel cautioned packers to be on their guard against discolored peas. He felt that this would be the most difficult requirement to meet. As to the water insoluble solids test for maturity in canned peas, he was doubtful whether 22 per cent is the proper breaking point between standard and sub-standard peas. The new requirements for canned tomatoes, too, will present some difficulty. The color requirements measure the poorest colored half of the can and make this standard more difficult to meet. As to the change in required drained weight, which has been increased from 45 to 50 per cent, the canners feel that some difficulty will be experienced with No. 10 cans.

L. G. Schermerhorn of the New Jersey Experiment Station said that the new Rutgers tomato offers great promise because of its bright red color and good flavor. He recommends it for use in such products as catsup and tomato juice.

Field Secretary Shook called the canners' attention to the terrific decline in the number of tomato canners and in

the production of canned tomatoes in the Tri-States since 1912. The number of canners has declined from 546 to 242 and the pack from a five-year average of 7,468,000 cases to 3,587,000 cases. A committee was appointed to study this situation.

James M. Shriver, Westminster, was elected first vice-president of the association.

Pedigreed Dogs

Hot dogs have gone "high-hat." Government graded and dated frankfurters and other sausage products are being sold in Philadelphia, Baltimore and Washington. The grades are based upon physical characteristics, and U. S. No. 1 smoked frankfurters must be uniform in length and thickness and be firm and resilient. The outer surface must be free from roughness, wrinkles and breaks, and it must have an attractive dark-wine color. The casings must be tender and the product commercially free from sinews, gristle, ligaments and cartilage. Furthermore, the U. S. No. 1 grade must have the color characteristic of high quality fresh pork and beef and contain no beef hearts, head meat, snouts, tripe or stomachs. The texture must be smooth and closely knit, and the frankfurters must have a definite sheen when freshly cut. They must be relatively free of beef fat particles and have a pleasant and appealing aroma and a delicate and appealing taste.

Short Week Dangerous

Widespread strikes, general labor unrest, loss of business confidence and other effects likely to prove injurious to recovery may be expected if the 30-hour week bill passes Congress. Such are the conclusions of the committee on labor problems representing 125 leading business and industrial publications. The committee believes that this legislation would defeat efforts to bring about more equitable production for prices of the agricultural products as against the products of industry.

Examples of increased cost of merchandise that would follow adoption of the 30-hour week are 36c. in the price of overalls, 23 in the price of work shirts and 75 in the price of work shoes. Complete copies of the committee's study are available at headquarters of Associated Business Papers, 330 West 42d St., New York, N. Y., at a price of 10c.

A Future for Dry Milk

Manufacturers of dry skim milk can look forward to better business. That was a point made by several speakers at the meeting of American Dry Milk Institute, Inc., at Chicago, April 10-11. There is a constantly increasing use of dry skim milk in many fields, the more than 100 delegates to the convention were told. In recent years, there has been a great increase in the amount used in ice cream and in beverage powders. Confectioners and bakers, too, are using more. A report on the progress of the school lunch bread idea indicated that the many bakeries which have placed this product on the market recently have experienced noteworthy sales increases. Moreover, a number of outstanding bakery organizations are taking steps to add this product to their line. This type of bread, which is sold primarily for its nutritive value, contains 12 per cent milk solids not fat.

In spite of its rosy future, the industry is not free of its troubles. It was pointed out at the meeting that an unstable price situation exists. Moreover, there is current a feeling that the name "dry milk" leads to popular misconception and that this terminology should be changed to "dry milk solids."

Among the outstanding speakers at the meeting was J. L. Kraft, Kraft-Phenix Cheese Corp. Talking on opportunities in the dairy industry, he gave an interesting view of important facts which have been developed through research on the nature and use of dairy products. He pointed out that the use of quality dairy products in confections had, in the case of Kraft's "Dairy-Fresh" caramels, created a demand throughout the nation.

William Markwardt, Quality Bakery, Joplin, Mo., talked on methods of increasing the sales of bakery products, stating that quality and proper merchandising were the two most important factors.

The members of the institute reelected the executive committee. C. E. Gray, Golden State Co., Ltd., San Francisco, continues as chairman; Walter Page, Borden Co., New York, vice-chairman; and M. J. Metzger, Bowman Co., Chicago, secretary-treasurer.

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Conventions

MAY

6-8—Southern Bakers' Association, Tutwiler Hotel, Birmingham, Ala. T. H. Fitzpatrick, 518 Chamber of Commerce Bldg., Birmingham, secretary.

14-15—Central Atlantic States Association of Dairy, Food and Drug Officials, annual, Richmond, Va. Ferd. A. Korff, Baltimore City Health Dept., secretary.

22-25—American Oil Chemists Society, annual, Peabody Hotel, Memphis, Tenn. John C. P. Helm, 509 Tchoupitoulas St., New Orleans, La.

23-24—Biscuit & Cracker Manufacturers Association of America, French Lick, Ind. R. T. Stokes, 233 Broadway, New York, secretary.

JUNE

2-4—New England Bakers Association, semi-annual, New Ocean House, Swampscott, Mass. Robert E. Sullivan, 177 Milk St., Boston, secretary.

3-7—Association of Operative Millers, annual, St. Louis. C. W. Partridge, 522 Board of Trade, Kansas City, Mo., secretary.

3-11—National Confectioners Association, annual, Palmer House, Chicago.

4-7—American Association of Cereal Chemists, annual, Denver. M. D. Mize, 833 Omaha Grain Exchange, Omaha, Neb., secretary.

10-11—Certified Milk Producers Association of America, annual, Chalfonte-Haddon Hall, Atlantic City, N. J. Dr. Harris Moak, 360 Park Place, Brooklyn, N. Y., secretary.

10-11—American Association of Medical Milk Commissioners, Chalfonte-Haddon Hall, Atlantic City, N. J.

17-19—National Macaroni Manufacturers Association, Hotel St. George, Brooklyn, N. Y. M. J. Donna, Braidwood, Ill., secretary.

25-27—American Dairy Science Association, University of Minnesota, St. Paul.

—Flavoring Extract Manufacturers Association of the U. S. Lake Shore Hotel, Chicago. E. L. Brendlinger, Dill Co., Norristown, Pa., secretary.

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Concentrates

In the first three months of the year, the quantity of sugar entering the United States amounted to 32.3 per cent of the total of 4,454,019 tons admissable this year . . . NRA has denied an application of Francis H. Leggett & Co. for exemption from the mayonnaise code provisions requiring the use of standard sized containers . . . Emergency cattle purchases now total 8,265,602 head.

Approximately one million farmers have applied for the 1933 corn-hog contracts . . . A marketing agreement for red sour cherries for canning and cold packing has been tentatively approved . . . A marketing agreement for canning asparagus grown in California was approved April 3.

Accident frequency and severity rates increased 25 and 24 per cent, respectively, in the meat packing industry during 1934 . . . National Confectioners Association has established a special bureau for handling fraudulent consumer claims against members . . . Tri-State Bakers' Association has been formed to organize bakers in southern Ohio, eastern Kentucky and western West Virginia.

Dr. A. G. Black succeeds Nils Olson as chief of the Bureau of Economics of the Department of Agriculture . . . Gerald B. Thorne, former executive assistant to AAA Administrator Chester C. Davis, now heads the live-stock and grains division of AAA, formerly the corn-hog section . . . Exceeding official estimates, federal revenue from beer taxes totaled $341,780,420 in 23 months.

Vitamin A has been found an indispensable food substance needed continuously by adult people . . . Canadian fishery experts have developed a glaze for frozen fish which will not crack, has antiseptic properties and is easy and economical to apply . . . A new outlet for milk has been created by Dry Milk Co., Inc., a Borden company, in the form of a fish lure comprising thin flakes of dry milk.

Men . . . Jobs . . . and Companies

Industry

• ATLANTIC (Iowa) CANNING Co. has been purchased by Fred Hagan, Fort Dodge, Iowa, and K. D. Stone, Des Moines.

• ARMOUR & Co. has purchased Virden Packing Co., San Francisco. The largest plant of its kind on the West Coast, it will be a link in Armour's expansion through the purchase of smaller packing plants at strategic points. Armour also bought Aaron Levy & Co., Brooklyn, N. Y.

• BEATRICE CREAMERY Co. has purchased the Hurd Creamery Co., Council Bluffs, Iowa. Charles McConnell will manage the company.

• E. J. BRACH & Co. is building a $250,000 air-conditioned addition to its Chicago plant.

• BORDEN SALES Co., INC., produce division, is handling meat products instead of Borden Farm Products Co., as previously announced.

• CALIFORNIA TEA PRODUCTS, INC., has taken over the former Cutler-Lobingier Cannery at Fullerton, Calif.

• CARNATION MILK PRODUCTS Co. has started construction of a new $250,000 plant at Sulphur Springs, Tex.

• THE COCA-COLA bottling plant at Grand Island, Neb., has been purchased by Tyler Bros. Co., Kansas City, and now is managed by A. R. Powell.

• COX BAKING Co., Jamaica, N. Y., may be taken over by Grennan Bakeries, Inc., a subsidiary of Purity Bakeries Corp. Earl A. Cox, who founded the bakery in 1925, and his son, Byron, are expected to step out.

• DOUGHNUT CORP. OF AMERICA will open in Buffalo a new shop to be operated in cooperation with manufacturers of Maxwell House coffee and Campbell's soups.

• EATMOR CHOCOLATE Co., Pittsburgh, has sold its entire equipment and machinery to Union Confectionery Machinery Co., New York.

• GENERAL ICE CREAM CORP., Schenectady, N. Y., plans to build a $300,000 ice cream manufacturing plant at Syracuse, N. Y.

• GLIDDEN Co.'s new soybean extraction plant in Chicago, erected at cost of $650,000, produces refined soybean oil, lecithin, soybean flour, and alpha protein.

• H. J. HEINZ Co. has bought a large factory at Melbourne, Australia, as a step in its international expansion program.

• LEWIS PACKING Co., Boston, will open a plant in Omaha early in May.

• LOOSE-WILES BISCUIT Co., Long Island City, N. Y., has established a distributing plant at Jamestown, N. Y.

• NATIONAL FRUIT PRODUCTS Co. is converting into a pickle factory the Shenandoah Valley Canning Corp., Harrisonburg, Va., at a cost of $100,000.

• PET MILK Co. recently started another addition to its Wayland, Mich., plant, the third within the last year.

• PEVELY DAIRY Co., St. Louis, has purchased the plant of Waterloo Milk Co., together with its wholesale and retail milk routes.

GUS G. KINDERVATER
Formerly general manager of all the ice cream operations of Borden Co., and president of International Association of Ice Cream Manufacturers, he has become connected with Good Humor Corp. He will analyze the operating and merchandising practices of the company.

• PURITY OATS Co. will reopen soon its plant at Keokuk, Iowa, to produce table-grade rolled oats. The plant will turn out 5,000 cases a day.

• QUAKER OATS Co., Cedar Rapids, Iowa, will replace its old elevator with a new $200,000 structure.

• REID-MURDOCK & Co., Chicago, has added to its "Monarch" line canned baby foods.

• W. R. ROACH Co., Grand Rapids, Mich., will erect three $6,000 storage buildings in various parts of Michigan.

• JACOB RUPPERT has purchased the old Ehret brewery property adjoining his plant. He will improve the buildings and will use them for storage. Later he will spend several hundred thousand dollars in construction work.

• SHARAF Co., Boston, has merged with H. D. Foss Co., Cambridge, Mass. The consolidated company will have a greater line of chocolates covering a wider price range.

• WILSON & Co., has opened a new cheese factory at Brenham, Texas.

Personnel

• GEORGE M. COCKLE has been given the general managership of Hauser Co., the new Armour & Co. subsidiary at Los Angeles. P. L. Robertson has become assistant manager at Armour's Spokane plant.

• CARL DIETZ, formerly refinery chemist for Corn Products Refining Co., has joined Johns-Manville as filtration engineer.

• FRANK DONNELLY, formerly an assistant sales manager of Wesson Oil & Snowdrift Co., now is manager of the flour department of Phillips Milling Co., San Francisco.

• HAROLD HANNUM succeeds the late J. L. Russell as manager of Kingan & Co.'s San Francisco branch.

• ROY Z. HERSHEY, formerly treasurer of Eatmor Chocolate Co., Pittsburgh, is reentering the confectionery industry as owner of Pitt Chocolate Co., Pittsburgh.

• ROBERT C. HESS, Athens, has been elected president of Ohio Millers' Association.

• RAY JOHNSON, former Iowa state treasurer, has gone to Noblesville, Ind., as secretary-general manager of Dugger-Van Sandt Packing Co.

• EARL MIDDLEKUFF has been made manager of the Graham Ice Cream Co., Omaha. For 23 years he had managed Franklin Ice Cream Co., Lincoln.

• WILLIAM J. MONAGHAN, general sales manager of Pioneer Ice Cream Brands, Inc., New York, has been made a vice-president.

• EDMUND K. MURRAY has been appointed plant superintendent of Edgar P. Lewis & Sons, Inc., Malden, Mass. He formerly was with Stone and Webster Engineering Corp.

• E. L. NEUBAUER recently was named vice-president and general manager of Field Packing Co., Owensboro, Ky.

• DANIEL PETERKIN, Morton Salt Co., Chicago, is a new member of the salt code authority.

• W. L. PRENTISS, for 25 years with Swift & Co., succeeds the late W. C. Potter as manager of the margarine department.

• IRA STURGIS RANDALL has resigned as general sales manager of the Frosted Foods division of General Foods Corp. to become sales manager of Continental Distilling Corp. of Philadelphia. George L. Wentley succeeds him as general sales manager of Frosted Foods.

• E. S. RANDOLPH heads up the newly organized Grand Ledge (Mich.) Milk Co.

• H. J. RICHEY has been transferred from managership of the Zanesville, Ohio, branch of National Biscuit Co. to head of the Columbus branch.

• KENNETH S. ROHRBOUGH has resigned as assistant chemist of St. Louis Merchants Exchange to become chief chemist for Majestic Milling Co., Aurora, Mo.

• ROBERT S. SCULL has resigned from the research department of American Can Co. to become production manager of Burnham & Morrill Co., Portland, Me.

• FRANK W. SMITH, Wakefield, R. I., has been chosen president of Independent Ice Cream Manufacturers' Association of Rhode Island.

• THOMAS G. SEXTON, John Sexton & Sons, Chicago, is the new president of Dried and Canned Food Association in Chicago.

RAYMOND L. BRANG
Associated for several years with Sperry Flour Co. at San Francisco, he has been elected vice-president of Gold Medal Foods, Inc., Minneapolis.

• EVANS J. THOMAS recently left Capitol Flour Mills Co., where he was general sales manager, to become vice-president and treasurer of Anchor Milling Co., Minneapolis.

• WILLIAM H. C. THOMPSON, formerly of the Columbus, Ohio, health department, has accepted a position as personal director of Columbus Packing Co.

• JACK WEHMAN recently was named manager of the new Quaker Oats branch at Tampa, Fla.

• PAUL R. WELCH, president of Welch Grape Juice Co., Westfield, N. Y., is recovering from injuries suffered recently in an automobile accident.

• E. WHITE has been moved from the Laurinburg, N. C., branch of Armour & Co. to manage the branch at Wilson, N. C. H. E. Lester becomes manager of the company's Albany, Ga., branch, and Edward H. Wolfe now is head of the branch house at Norristown, Pa.

Associated Industries

• HINDE & DAUCH PAPER Co., Sandusky, Ohio, announces acquisition of Evans Fibre Box Co., Chicago.

• LIQUID CARBONIC CORP., Chicago, has appointed A. J. Cordrey manager of technical sales.

• LUKENS STEEL Co., Coatesville, Pa., has appointed Walter E. Barnes assistant to the vice-president in charge of sales.

• METAL PACKAGE CORP. has changed its name to National Can Co., Inc.

• PURE CARBONIC, INC., New York, has appointed J. M. Gray representative at Jacksonville, Fla. The company also has opened a new warehouse in Pittsburgh.

• READ MACHINERY Co., INC., York, Pa., has opened an office at Atlanta, in charge of C. A. Gorndt. The company also announces the appointment of Charles d'Ardussey as district sales manager of eastern Pennsylvania.

• REPUBLIC STEEL CORP., Youngstown, Ohio, has added to the list of warehouse distributors of Enduro stainless steel the Gilmore Steel & Supply Co., San Francisco.

• SPRAGUE-SELLS CORP., Hoopeston, Ill., has opened a new office in Baltimore, with Harold R. Lewis in charge. The company also arranged with George W. Goddard Co., Ogden, Utah, to represent the Anderson-Barngrover and Sprague-Sells Divisions of Food Machinery Corp.

Deaths

• ALBERT ARTIQUES, 60, vice-president and general manager of Socola Rice Mills, New Orleans, recently.

• LEWIS M. BRICKER, 57, a pioneer in the establishment of chain bakeries, at Lemoyne, Pa., April 3.

• THOMAS C. BROWN, 41, owner of Panhandle Packing & Sales Co., Borger, Texas, recently.

• HENRY G. ECKSTEIN, 75, founder of Cracker Jack Co., Chicago, at Ontario, Calif., April 11.

• DANIEL FEELY, 73, former manager of Cudahy Packing Co., at Joliet, Ill., recently.

• C. E. FISHER, treasurer and plant manager of York (Pa.) Caramel Co., and a confectioner for 40 years, at York, recently.

• M. C. MEEK, 44, secretary of Dimple Ice Cream & Creamery Co., Columbia, Tenn., recently.

• J. L. RUSSELL, manager of Kingan & Co. at San Francisco and founder of that branch, March 25.

• E. W. STURDIVANT, 65, chairman of the board of Collins Bakery Co., Atlanta, and former secretary and treasurer of American Bakeries Co., recently.

• J. ROSCOE WHEATLEY, 33, vice-president of Hillsboro-Queen Anne Cooperative Corp., Baltimore, April 9.

PATENTS

Cheese Pasteurized Continuously During Passage Through Heating and Cooling Zones of a Jacketed Cylinder Fitted With a Forced Feed Worm Screw — Bruno Duttweiler, Vevey, Switzerland, to Raw Products, Ltd., London, England. No. 1,993,264. March 5, 1935.

Free-Flowing Dessert Powders Containing Gelatine in a Highly Dispersed State —William E. Stokes, Brooklyn, N. Y. and David F. Silver, Forest Hills, N. Y., to Royal Baking Powder Co., New York, N. Y. No. 1,993,289. March 5, 1935.

Baking Doughs Mixed Continuously in Inclined and Compartmented Mixers — Heinrich Roser, Stuttgart-Cannstatt, Germany, to Baker Perkins Co., Inc., Saginaw, Mich. Nos. 1,993,528 and 1,993,529. March 5, 1935.

Doughnuts Mixed, Formed and Cooked in a Self-Contained Unit Operating Through a Vertical Plane — Charles E. Kennedy, West Bridgewater, Mass., to Jones & Vining, Inc., Brockton, Mass. No. 1,993,609. March 5, 1935.

Fats and Fatty Materials Stabilized by the Use of Inorganic Acids Containing Stably-Bound Oxygen and Their Derivatives as Anti-Oxidants — Albert S. Richardson, Wyoming, Ohio, Frank C. Vibrans, Chicago, Ill. and John T. R. Andrews, Cincinnati, Ohio, to the Procter & Gamble Co., Cincinnati, Ohio. No. 1,993,181. March 5, 1935.

Method for Determining Solids Content of Eggs—Willard H. Atkinson, Chicago, Ill. No. 1,994,264. March 12, 1935.

Oxidation Inhibited in Animal and Vegetable Fat by Use of Di-p:p'-Hydroxy-Diphenyl—William S. Calcott and William A. Douglass, Penns Grove, N. J., and Herbert W. Walker, Wilmington, Del., to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 1,993,771. March 12, 1935.

Cocoa Solids Held in Suspension in Beverage by Use of Pectin—Glenn H. Joseph, Ontario, and Robert D. Nevvicek, Pomona, to California Fruit Growers Exchange, Los Angeles, Calif. No. 1,993,932. March 12, 1935.

Today's Plant

(Continued from page 218)

Readers will appreciate that difficulties cannot be overcome by a few sentences. The activities summarized in the preceding paragraph were in reality accomplished after much time and effort had been expended. Raising capital in these times is difficult and only the clearness and thoroughness of the plan made it possible. It was a hard job well done. Energy, hard work, and a clearly worked out plan of needed changes won the day.

IN attempting work of this kind, reorganization, etc., it is essential that plans and ideas for changes be worked out in detail. A complete program must be given the owners and the resulting benefits clearly and concisely shown. Vagueness and uncertainty must be avoided.

The management of the company has now definitely decided to sell its present real estate holdings. It is recognized that the times make this rather difficult but, on the other hand, the sooner tried the sooner done. It is hoped that when this sale is completed a small modern plant may be built that is exactly suited to present needs. The aim is to grow and constantly acquire new business, but realize the advantage of a small, busy plant.

So now, with a good volume of sales, the company is operating a small plant, set up economically and efficiently. Means have been devised to get needed new up-to-date equipment and the sales and delivery department is geared to present levels. Accounts payable have been brought into line by a capital contribution. Much unused equipment has been sold for what it would bring and the rest otherwise disposed of. The business, outside of fixed charges on unused plant, shows a fair return and is not going behind even after deductions for these items. The outlook seems to justify the effort. Conservatively speaking the prospects look good.

Freedom from Moisture

(Continued from page 243)

when exposed to the air fermentation proceeds rapidly.

Mold will quickly develop in powdered malt, causing it to turn rancid and become unfit for use if the containers or their contents are exposed to excessive moisture.

Malts are not usually attacked by insects, except through carelessness.

Syrups

CONTAINERS

Glycerin is shipped in steel drums.

Honey is packed in tin cans which are shipped in iron-strapped wooden cases.

Molasses, pioneer syrup and syrup are received in tight-coopered barrels.

Corn syrup is packed in wooden barrels, steel drums or tanks.

SHIPPING

All syrups may be shipped at normal temperatures. Each container should be carefully inspected for damage and leakage when received.

STORAGE

All syrups except molasses may be safely stored in a cool place. Molasses should be held at 50 deg. F. However, if 50 deg. storage is not available, it also may be stored in a cool place; but as soon as the barrels are placed where they will *positively* not be moved until the contents are to be used, a $\frac{3}{8}$ in. hole must be made in the upper head in order to vent the gases which are given off at temperatures above 50 deg. F.

PEST CONTROL

Syrups are not bothered by any of the ordinary pests, except when they wander into unsealed containers and drown, or when the syrups leak from the containers and ferment, affording a breeding place for vinegar flies. General sanitation is the principal control.

Preserves

CONTAINERS

Glacé cherries, candied fruits and preserved fruits are received in sealed wooden tubs.

Grapefruit, lemon, and citron peels, and pineapple fingers are packed in paper-lined wooden boxes.

Jams and jellies are shipped in sealed wooden barrels.

Orange and pineapple pulp and canned fruits are packed in tin cans and shipped in fiberboard boxes.

SHIPPING

All preserves may be shipped in clean, dry vehicles at ordinary temperatures. Soiled or damaged containers should be examined carefully when received.

STORAGE

Preserves in sealed tubs, barrels or tin cans may be stored in a cool, dry place until opened, but should be placed in 32 deg. F. thereafter until used up. Those in wooden boxes should always be kept in 32 deg. F. to prevent excessive drying and to guard against the intrusion of insect pests.

PEST CONTROI

Both storage moths and beetles and particularly ants will attack preserves in opened or unsealed containers when in normal temperature. Molds also develop readily on and through them under the same conditions. The action of both insects and molds is practically stopped when they are placed in 32 deg. F.

Although rodents are not particularly fond of preserves they will occasionally gnaw through the lighter weight containers to reach them. This of course may happen either in or out of cold storage and careful rodent control is the only practical way to prevent it.